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COAL RESERVES

HEARING

BEFORE THE

SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

OF THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON THE

NATIONAL COAL COUNCIL'S RESERVE DATA BASE REPORT AND THE STATE OF INFORMATION RELATING TO THE QUALITY AND RECOVERABILITY OF U.S. COAL RESERVE

SEPTEMBER 18, 1987

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COAL RESERVES

FRIDAY, SEPTEMBER 18, 1987

U.S. SENATE,
SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m., in room SD-366, Dirksen Senate Office Building, Hon. John Melcher presiding.

OPENING STATEMENT OF HON. JOHN MELCHER, A U.S. SENATOR FROM THE STATE OF MONTANA

Senator MELCHER. The subcommittee will come to order. This morning we are meeting in public hearing to review the National Coal Council's Reserve Data Base Report and to look at the information regarding the quality and recoverability of U.S. coal reserve.

As the policy debate continues on such issues as acid rain and clean coal technology, the accuracy and reliability of information on coal reserves becomes very critical. The National Coal Council's June report points out some problem areas in our information on how we collect it, how we tabulate it and what we really know about recoverable coal reserves.

According to the study, the Demonstrated Coal Reserve Data Base may significantly overstate the amount of recoverable reserves. At this hearing, we will be listening and be informed by a variety of witnesses on this particular point. If this is the case, steps do need to be taken to insure that information used in making major policy determinations is accurate.

I am very interested in the study the U.S. Geological Survey and the Kentucky Geological Survey are conducting in Pike County, Kentucky to assess available coal reserves. As I think they plan to show us today, there is a substantial difference between the total coal resource in the area they are studying and the reserves available for mining.

This type of study needs to be undertaken not just in Pike County, Kentucky but also in Montana and throughout the country to learn the degree of such discrepancies between the total resources. We have an awful lot of coal. It is there, but it is unavailable for mining for various reasons, mostly economic and some of which are technical reasons. Generally speaking, coal can be there but it would not be economic to mine it.

It is important that as we grapple with the policy decisions we have a true picture of what is actually available and can be mined in U.S. coal reserves.

So I am going to recognize the senior Senator from Kentucky, very much a leader here in this committee on coal policy.

Senator Ford.

STATEMENT OF HON. WENDELL H. FORD, A U.S. SENATOR FROM THE STATE OF KENTUCKY

Senator FORD. Thank you very much, Senator Melcher.

First, I am grateful to you for holding these hearings.

Second, Pike County could be singled out in a couple of ways. One, it is the largest coal producing county east of the Mississippi, and if it was flattened out it would exceed the size of Texas.

Senator MELCHER. Good. Let us flatten it out.

Senator FORD. Senator, I do not think we can environmentally do that.

I requested this hearing, as you know, Mr. Chairman, to examine the quality of information regarding the true amount of recoverable coal resources in the United States. During debates on issues with a significant impact on coal, such as acid rain and clean coal technology, I hear people telling figures of billions, even trillion tons of coal that are available to us.

While coal certainly is the most abundant source of energy in the United States, I think it is important to have accurate assessments of not only the amount of coal that is actually recoverable but also the quality of the coal. What good does 488 billion tons of coal do us if large amounts are unmineable or are of such a quality that it is unusable?

The National Coal Council's recent report on the reserve data base points to gaps in U.S. coal resources and the assessment of that information and concludes that the actual Demonstrated Coal Reserve Data Base for recoverable coal is considerably smaller than previously suspected.

The reason for this, Mr. Chairman, according to the report is that the reserve base figures include coal that is nonmineable, coal lost during mining and preparation, coal lost when adjacent seams are mined, coal unavailable due to competing land uses, and several other items.

The report makes recommendations to rectify these problems, and I look forward to hearing more about them today from our witnesses.

Some research currently is being conducted that seeks to provide needed information in this area. We will hear from the witnesses today. Kentucky is participating with the U.S. Geological Survey in a study that endeavors to qualify the amount of recoverable coal in a 55 mile quadrangle in Pike County, Kentucky.

In studying just one coal seam in the Matewan Quandrangle, the upper Elk Horn number 2, of 106 million short tons of original coal reserves, 14 million tons have been mined out, leaving 92 million remaining.

Of these 92 million tons, and I underscore this, only 28 million tons are available resources after subtracting out coal unmineable

for reasons including proximity of cemeteries, towns, power lines, pipelines, gas and oil wells and streams, areas too shallow or too deep to mine by underground methods and so forth.

This is excellent research, Mr. Chairman, that addresses some of the problems set out in the National Coal Council's Report. I commend both the Kentucky and U.S. Geological Surveys for their work in this area; however, this program needs to be expanded, as you have just related. I am supporting increased funding for the USGS to do this.

Currently, the project is being funded through the National Coal Reserve Data System with about, I think, only $150,000 available to USGS in Fiscal Year 1987. At this rate of funding, by the time enough of these studies are completed to make a contribution to policy discussions, the policy questions may have long been decided.

Mr. Chairman, again, I am grateful to you for holding this hearing this morning. I do not intend to hold you up too long, but I do want to get into some of the basic questions and some of the findings as they relate to the preliminary studies.

Thank you.

Senator MELCHER. Thank you very much, Senator Ford. We will proceed now with public testimony. We will go first with a witness for the private sector, Donald Bellum, President of Cyprus Coal Company from Engelwood, Colorado.

David Bellum is representing the National Coal Council, and we will be glad to have your testimony right now. Welcome to the committee.

STATEMENT OF DONALD P. BELLUM, PRESIDENT, CYPRUS COAL CO., ENGELWOOD, CO, ACCOMPANIED BY GARDAR G. DAHL, JR., MANAGER OF GEOLOGY, CYPRUS COAL CO.

Mr. BELLUM. Good morning, Mr. Chairman, Senator Ford. My name is Donald P. Bellum. I am President of Cyprus Coal Company and a member of the National Coal Council.

Senator Melcher, you are probably aware that Cyprus Minerals, which is our parent, is an operator of a large talc mine in Montana in Uranus and also operates a processing plant near Three Forks, an employer of several hundred people in that state.

Senator MELCHER. We certainly are aware of that, and we encourage you to keep coming. We have a lot of things to mine in Montana, and we like to supply the national needs of those minerals that we do have. We enjoy having you in Montana, Mr. Bellum; that is, we enjoy having Cyprus in Montana.

Mr. BELLUM. I appreciate those comments. It is a pleasure for us to be operating in that state.

Senator Ford, as you know, we are a major coal operator in eastern Kentucky and an employer of over 1,000 people in that area, so we have an interest in your state, as well.

I am here today at your invitation to discuss the Reserve Data Base Report of the National Coal Council which was prepared for and presented to the Secretary of Energy in June of this last year.

With me today is Gardar Dahl, who is Cyprus' Manager of Geology and who is very intimately involved in the reserve data base

work group. He is very intimately knowledgeable of the work that took place there.

As you know, I have submitted for the record my complete statement along with a copy of the Reserve Base Report. As a result, I am going to confine myself to a very brief summary of comments today.

As you probably know, the National Coal Council is a private sector advisory group chartered in 1984 under the Federal Advisory Committee Act to provide advice when requested by the Secretary of Energy about coal matters to guide him in the setting of national energy policy.

The Coal Council is patterned after the 40 year old National Petroleum Council. Advice from the Coal Council is transmitted to the Secretary in the form of reports based on studies conducted on subjects requested and approved by the Secretary.

The studies are conducted by the Council and not at the expense of the government.

In November of 1986, the Secretary authorized the National Coal Council to conduct a study and make recommendations regarding the Demonstrated Coal Reserve Data Base. This study was to accomplish two things:

First, determine and identify if there were any gaps or deficiencies in the data base which might produce misleading or inaccurate information critical to policy decisions; and

Secondly, determine the degree to which State and Federal statutes, regulations, enforcement agencies and regulators impact the amount of recoverable reserves that are included in the data base.

The Council approved the results of this study in June of 1987 and forwarded a report to Secretary Herrington. The conclusions of this report can be summarized as follows.

First, the actual Demonstrated Reserve Base for recoverable coal is considerably smaller than previously suspected.

Secondly, numerous laws, policies and regulations impose economic and physical limitations on the amount of coal in the data base that can be recovered by present mining methods.

There are no standards in use today at either the regional or the national level that present a true picture of the reserve base from either a technical or an economic point of view.

As a result of that, the report made the following recommendations:

First, that the Department of Energy in conjunction with the U.S. coal industry and other branches of the Federal and State Governments should develop better standards for estimating reserves in the data base which will utilize more realistic criteria to determine the mineability and recoverability of the coal;

Secondly, recognize the effect of changing economic conditions on the coal reserves; and

Thirdly, consider the impact of competing land uses so that the single reliable and accurate data base is developed.

The second recommendation was that the Secretary of Energy should establish a high level intergovernmental working group to study and make recommendations concerning the current and proposed laws, policies, regulations and actions of regulatory bodies

which could adversely impact the amount of recoverable coal in the data base reserve.

The third recommendation was that the Secretary of Energy should initiate a comprehensive and detailed survey of all coal producers and individual producing properties to obtain an indepth, quantifiable and thorough analysis of the technical and economic impacts of the laws, policies and regulations on the recoverable coal reserve data base.

I shall now be pleased to answer any questions that you have on this report. If I cannot answer them, Gar Dahl can.

[The prepared statement of Mr. Bellum follows:]

TESTIMONY OF
DONALD P. BELLUM
PRESIDENT
CYPRUS COAL COMPANY
BEFORE
THE SUBCOMMITTEE ON
MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
OF THE UNITED STATES SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES

Mr. Chairman, Members of the Subcommittee on Mineral Resources Development and Production of the United States Senate Committee on Energy and Natural Resources.

My name is Donald P. Bellum. I am President of Cyprus Coal Company of Engelwood, Colorado, a division of Cyprus Minerals, Inc. I am also a charter member of The National Coal Council appointed to serve in the spring of 1985 and reappointed in the spring of 1987. I am also a member of the Coal Policy Committee of The National Coal Council and was a member of it Reserve Data Base Work Group. I have with me today, Mr. Gardar G. Dahl, Jr., Manager of Geology of Cyprus Coal Inc, who was intimately involved, as an associate, with the Reserve Data Base Work Group.

I am pleased, as a member of the National Coal Council, to accept your invitation to present testimony on the Council's report on the Reserve Data Base, which was presented to the Secretary of Energy in June of 1987. The National Coal council is governed by the Federal Advisory Committee Act. Accordingly, our reports represent the views of all of our members with provision made for dissenting views if any. In testifying on a report of the Council, I must therefore confine my comments and answers strictly to material covered by our study.

THE NATIONAL COAL COUNCIL

The National Coal Council was chartered by the Secretary of Energy in the Fall of 1984 under the Federal Advisory Committee Act. The Council is patterned after and is similar to the National Petroleum Council which has been in existence for almost 40 years.

The purpose of The National Coal Council is solely to advise, inform and make recommendations to the Secretary of Energy with respect to any matter relating to coal or the coal industry. The advice of The National Coal Council is given to the Secretary of Energy on matters requested by and/or approved by him. Such advice is transmitted to the Secretary by the form of reports

prepared and approved by the Council as a public service without cost to the government. Like the National Petroleum Council, the National Coal Council provides objective, non-partisan and hopefully, balanced views to the Executive Branch on coal and coal-related matters.

There are presently 118 members of The National Coal Council, all of whom were appointed by the Secretary of Energy with the consent of the White House. These members give a well-balanced representation of all segments of the coal and coal related industries --- from all sections of the country. There are also members with interests outside of the coal industry. The members serve without compensation. Additionally, the Council receives no funds from the Federal government; therefore, the operations of the Council are totally financed through contributions from the members and accordingly the Council is considered a private sector, not governmental, entity.

In summary, the mission of The National Coal Council, a self-funded private sector group, is to enable the coal and coal related industries to objectively advise, inform and make recommendations to the Secretary of Energy with respect to any matter relating to coal, in order to assist the Secretary in the accomplishment of his goals for achieving economic and energy security.

In August 1986, the Honorable John S. Herrington, the Secretary of Energy, asked The National Coal Council to consider undertaking a study to "Conduct a strenuous critique of the demonstrated coal reserve data base." At their meeting in November 1986, the members of the Council agreed to conduct a study and make recommendations as requested by the Secretary and further suggested that the study be expanded to consider "The degree to which state and federal statutes, regulations, enforcement agencies and regulators impact the amount of workable reserves identified in such a data base." The Secretary, in turn, authorized the Council to proceed on the expanded study. A study group was established under the Coal Policy Committee and completed its efforts in the Spring of 1987. At the June 1987 Full Council meeting, the members of the Council approved the study and authorized that it be presented to the Secretary of Energy. I have enclosed copies of the Report with my testimony for your information and use.

I direct your attention to the letter, at the front of the report, from James W. McGlothlin, past Chairman of The National Coal Council, to Secretary of Energy Herrington submitting the report on the Reserve Data Base. This letter and the Executive Summary on pages one and two of the report summarize the findings and recommendations of the report.

Very briefly, the study found that there were a number of different data bases in existence within different entities of the Federal government; that these were often duplicative and repetitive; that there were shortcomings and a lack of consistency between them and that consolidation and streamlining is desireable and necessary. It was also found that local, state and federal policies, laws, and actions have negatively impacted on the amount of coal accessible and that consequently the amount of coal that can in fact be considered actually recoverable is probably overstated. To quote from Chairman McGlothlin's letter to summarize the reports conclusion and recommendations:

"(1) The actual DRB for recoverable coal is considerably smaller than previously suspected.

(2) Numerous laws, policies and regulations impose economic and physical limitations on the amount of coal that can be recovered in the DRB.

(3) There is no standard, whether regional or national in use today which can be used to present a true picture of the DRB from either a technical or economic viewpoint.

The Council believes that a number of steps should be taken by your office to clarify the uncertainties and quantify the adverse impact of local, state and federal laws, policies, regulations and actions of regulatory bodies on the amount of recoverable coal in the DRB. These recommendations include but are not limited to:

(1) The Department of Energy, in conjunction with the U.S. coal industry, and other branches of the federal and state governments should develop better standards for categorizing reserves which recognize realistic estimation criteria, mineability and recovery criteria, the effect of changing economic conditions and the impact of competing land uses, so that a single, reliable and accurate data base is developed.

(2) The Secretary of Energy should establish a high level inter-governmental working group to study and make recommendations concerning all current and proposed laws, policies, regulations and actions of regulatory bodies which could adversely impact the amount of recoverable coal in the DRB.

(3) The Secretary of Energy should initiate a comprehensive and detailed survey of all coal producers and individual coal producers and individual coal producing properties to obtain an in-depth, quantifiable and thorough analysis of the technical and economic impacts of laws, policies and regulations on the recoverable coal in the DRB."

The members of the Council believe strongly that this report emphasizes the crucial need for a more accurate appraisal of coal, resources and shows clearly that impediments exist which have an impact on the recoverability of America's most abundant energy resource. We further believe that by addressing these shortcomings we will more accurately be able to plan our energy future.

Mr. Chairman, this completes my testimony.
Thank you.

Senator MELCHER. I want to thank you very much, Mr. Bellum, for being here with us and for being brief and for presenting data which is important to us. I do have a couple of questions.

What definition should we accept for Demonstrated Reserve Base? How should we look at that? What are we actually saying there when we want a Demonstrated Reserve Data Base, for instance?

Mr. BELLUM. I believe that the Demonstrated Reserve Data Base ought to reflect the reserves that are mineable under the conditions in which we operate today.

Senator MELCHER. Including economic?

Mr. BELLUM. Yes.

Senator MELCHER. Including environmental?

Mr. BELLUM. Yes. Economics are an integral part of reserves, whether they are coal reserves or copper reserves or talc reserves or whatever. Economics should enter into the calculation.

Senator MELCHER. Senator Ford raised this point. How do we fit in the quality of the coal? We look at Btus, do we not?

Mr. BELLUM. Yes.

Senator MELCHER. So we do establish a base line for Btus and say, well, a ton of coal is 5,000 Btus per pound in a ton of coal in reserve? Would we go that far?

Mr. BELLUM. I think we need to quantify the coal reserves by the Btu content, but 5,000 Btu per ton coal, which is really a lignite, is burnable, as well as 13,000–14,000 Btu coal is burnable, but we need to categorize it.

Senator MELCHER. All right. So that is the key part, to categorize it on quality based on Btus?

Mr. BELLUM. Based on Btu and other qualities.

Senator MELCHER. What are the other qualities?

Mr. BELLUM. I think we need to categorize it by sulfur content, because sulfur is very important in our environment today.

Senator MELCHER. Yes, we vote for that. There is not too much sulfur in Montana. I think that ought to be right up there, a high priority on our data base.

Senator Ford.

Senator FORD. If we quantify coal as to Btus, Wyoming will never catch us.

Mr. Bellum, who uses a DRB and for what purposes?

Mr. BELLUM. I think the DRB is used by government agencies, or it should be, anyway, in trying to quantify the impact of laws, policies and regulations on the reserve of mineable coal. Industry does not use it to a great extent. Each of us as a company fairly well knows what our reserves are.

Senator FORD. Does that mean that whatever you have acquired under lease is basically your support for whatever you do in the future, but you are not looking at some of the problems that you might face in out years as it relates to the type of coal you may be able to recover and how much might be out there to be recovered?

What I am saying is that each company will rest on its own bottom as far as the reserves they have, but at some point do you need to look at what might be available, or is there just so much that you do not yet need to look at that?

Mr. BELLUM. I think you are correct. It is important to also have some insight on what the total reserve base of the country is and the quality of that base in making economic decisions as to how you operate your mines and where you will mine in the future.

Senator FORD. Let me look at a problem that we may be facing. If you have a compliance goal of .9, can you tell how much coal is out there that could be used?

Mr. BELLUM. At this point in time, for the country we cannot say. We cannot tell you how much coal there is at .9 sulfur, no. That data is not included in the data base.

Senator FORD. Would it add a great deal to the discussion of the issues that are bound to face us if we had that information also, Mr. Bellum?

Mr. BELLUM. Yes. I think it would be very important to have that information in making policy decisions as to acid rain and other important issues.

Senator FORD. There would be a lot less coal available at .9, would it not?

Mr. BELLUM. It is hard to say how much coal is out there because we do not know, but we do know that coal reserves in this country have sulfur contents ranging from .3 of 1 percent of sulfur, much of which is in Montana, to 5, 6, 7, 8 percent; however, we do not know how much of that falls below 1 percent or how much is over 2 percent, no.

Senator FORD. What are some of the problems that we might encounter in using DRB as it currently exists in our policy debates?

Mr. BELLUM. I think we can be misled to believe that we have a much larger coal reserve base in this country than we really do. Our study has indicated that the 483 billion tons in the data base is the tons that exist in the ground, but that is not the tonnage that can be extracted from those reserves.

Senator FORD. The NCC Report states that better characterization of recovery factors by state or region would help to define the amount of recoverable coal.

The EIA Report of 1982, in that report on the DRB for coal in the U.S. on January 1, 1980, I believe was the date, states in its introduction that "the proportion of coal that can be recovered, reserves, ranges from less than 40 percent in some underground mines to over 90 percent in some surface mines, and EIA believes that on a national basis at least one-half of their demonstrated in-place coal is recoverable at the present time."

Do you agree with that statement?

Mr. BELLUM. Our study indicated that somewhere between 50 and 70 percent of that coal might be recoverable that is in the data base. So, yes, I think that is in the range.

Senator FORD. One more question, Mr. Bellum.

In your report in Table 1 on page 5, if you want to look at that, it gives as matrix of resources/Demonstrated Reserve Bases.

What accounts for the discrepancies between the USGS 1984, Keystone 1986, 1987 State Agency and the DOE 1985 totals?

Mr. DAHL. Senator, the difference between the various listings here, the tabulations, you will see USGS 1974, USGS 1984, Keystone 1986, and the 1987 State Agency listings. These are all a cate-

gorization of resources which fall beyond what is considered demonstrated by the Department of Energy.

The demonstrated portion of the term "demonstrated reserve base" refers to all coal which occurs within half a mile of a measured point, whether that is coal mine, a drill hole, outcrop or what have you.

The resources extend this a considerable distance beyond those measured points, and the Department of Energy has taken those hypothetical reserves out of the resource reserve base.

Senator FORD. I said I had just one more question, but you know how it is when something reminds you of something else.

EIA's testimony indicates that some information on coal reserves is not available due to its proprietary nature. Do you agree that this is a problem in proving the coal reserve data?

I mean, that is releasing your information on how many tons of coal you have in reserve and that sort of thing and the percentage of sulfur and Btus and all that. It is your information, and you do not want to release that.

Does that damage our ability to acquire good data?

Mr. BELLUM. No, it does not. I think there is adequate public information that we can make good estimates of the coal reserves if the effort and the system is in place to do that.

Senator FORD. I have no further questions. It may be, Mr. Bellum, that during the morning other questions might come up, and I will have the committee staff submit those questions to you. I hope that you will respond in a timely manner in writing to those questions, if that will be all right with you.

Mr. BELLUM. Yes, I will do that. Thank you.

Senator FORD. You are mighty nice to be here today, and I do appreciate your interest not only in what is going on now but what might be coming down the pike. We all look forward to working with you.

Mr. BELLUM. Thank you.

Senator FORD. Thank you.

Senator MELCHER. I have one question. Let us speak to Cyprus and see if it relates to the National Coal Council.

Do you look at Keystone figures? Is that what you look at if you want to look at a data base?

Mr. BELLUM. No, I do not think we would look at Keystone figures.

Senator MELCHER. Then that would be pretty much true of others in the National Coal Council? You would not look at Keystone for a source of information?

Mr. BELLUM. No.

Senator MELCHER. Thank you very much.

The next witnesses will be Jack S. Siegel, Deputy Assistant Secretary for Coal Technology, Office of Fossil Energy at the Department of Energy; and John Geidl, Director, Office of Coal, Nuclear, Electric and Alternate Fuels Energy Information Administration, also at the Department of Energy.

Who talks first? Mr. Siegel?

Mr. SIEGEL. That would be fine, sir.

Senator MELCHER. All right.

STATEMENT OF JACK S. SIEGEL, DEPUTY ASSISTANT SECRETARY FOR COAL TECHNOLOGY, OFFICE OF FOSSIL ENERGY, DEPARTMENT OF ENERGY

Mr. SIEGEL. Mr. Chairman, Senator Ford, thank you very much for the opportunity to testify and participate as a witness at this hearing regarding the National Coal Council's recently released report on the Demonstrated Coal Reserve Data base.

I am the Deputy Assistant Secretary for Coal Technology in the Office of Fossil Energy in the Department of Energy. With your approval, I would like to provide my complete statement for the record and give you a summary of that statement this morning.

Senator MELCHER. Yes, your complete statement will be made part of the record, and we would be pleased if you would summarize it.

Mr. SIEGEL. Thank you.

The Federal Advisory Committee Act requires a Federal official to be designated for the National Coal Council. The responsibilities of that Federal official include calling or approving each public meeting, approving meeting agenda, attending meetings and adjourning meetings when it is determined that adjournment is in the public interest. I am currently the designated Federal official of the National Coal Council.

With your approval, I would like to defer to the Energy Information Administration and the United States Geological Survey regarding portions of the Council's report that address the methodologies used in developing and updating the Demonstrated Coal Reserve Data Base. These two organizations are intimately involved with the Data Base and are the Administration's experts in those aspects.

Rather, I wish to address the process of developing ideas for studies to be undertaken by the Council, the manner in which the Department of Energy requests studies and provides information for use by the Council in its reports, and the process that is used for responding to recommendations made by the Council in their reports.

On August 21, 1986, after the Office of Fossil Energy had polled other Department offices for study suggestions, the Secretary transmitted to the Council a request for two studies to be performed. The studies requested were Improved International Competitiveness of U.S. Coal and Coal Technology and the Conduct of a Strenuous Critique of the Demonstrated Coal Reserve Data Base.

In addition, the Council requested and the Secretary approved a study to examine the ability for coal to displace imported energy. The Coal Policy Committee recommended the pursuit of these studies to the Council on November 7, 1986, and the full Council undertook the studies on November 26, 1987.

The Council established work groups from their membership to perform the studies, and the Department provided available information upon request. I operated as the designated Federal official at these public meetings.

Findings from the work groups were submitted to the Coal Policy Committee for two of the studies, the reserve data base and improved international competitiveness, on May 5, 1987 for consider-

ation. The Coal Policy Committee reviewed the information and, with some modifications, reported it to the full Council in the form of draft reports.

The full Council voted on June 2, 1987 to submit the reports to the Secretary. The Reserve Data Base Report was provided in final form to the Secretary in July 1987, and the International Competitiveness of U.S. Coal and Coal Technologies Report was submitted in August 1987.

We expect a third report on coal back-out of imported energy to be transmitted to the Secretary this coming December.

Now, I would like to turn just for a few minutes specifically to the current assessment of the recommendations of the two reports which were most recently submitted. As many recommendations, such as performing studies which address economic impacts to recovering coal due to mine safety and surface mine reclamation regulations, involve lead responsibilities from other government agencies, the Secretary on August 21, 1987 transmitted the reports to heads of all of the organizations which were referred to in the reports.

These included the Department of Army, the Interstate Commerce Commission, the Environmental Protection Agency, the Department of Transportation, the Department of Commerce, the Department of Labor, and the Department of Interior.

The Secretary requested a response from these agencies on actions they would take regarding recommendations under their purview. We are currently acquiring their responses as well as synthesizing responses received from the Department of Energy offices.

We will keep the subcommittee informed of our response to the National Coal Council on their Demonstrated Coal Reserve Data Base Report.

Clearly, we recognize the importance of the existence of the Demonstrated Coal Reserve Data Base for policymaking at all levels of government. That is why the Council was requested to assess it. The Council's recommendations in the Reserve Data Base Report will be seriously considered by the Department.

I would be pleased to answer any questions that you may have. Thank you.

[The prepared statement of Mr. Siegel follows:]

TESTIMONY

OF

JACK S. SIEGEL

DEPUTY ASSISTANT SECRETARY

FOR

COAL TECHNOLOGY

OFFICE OF FOSSIL ENERGY
DEPARTMENT OF ENERGY

BEFORE THE
SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

SEPTEMBER 18, 1987

Mr. Chairman, thank you for the opportunity to testify and participate as a witness at this hearing regarding the National Coal Council's recently released report on the Demonstrated Coal Reserve Data Base. I am the Deputy Assistant Secretary for Coal Technology in the Office of Fossil Energy, the Department of Energy.

Recognizing the important role coal does play and its potential for further penetration in energy economies throughout the world, the Secretary of Energy chartered the National Coal Council on November 21, 1984, and inaugurated its full operation on June 10, 1985, at the Council's first meeting. The National Coal Council was chartered under the Federal Advisory Committee Act (Pub. L. 92-463) to provide advice and recommendations on a continuing basis as requested by the Secretary on general policy matters relating to coal. The approximately 100 members of the Council are appointed by the Secretary and represent academia; small and large coal producers; state associations, regulators and governments; transporters; users; and environmental interests, among others. The heterogeneous makeup of the Council provides the Secretary with input on coal policy development and issue resolution from a broad perspective of energy interests.

The Federal Advisory Committee Act requires a Federal Official to be designated for the Council, whose responsibilities include calling or approving each public meeting, approving meeting agenda, attending

meetings and adjourning meetings when it is determined that adjournment is in the public interest. I am currently the designated Federal Official of the National Coal Council.

I would like to defer to the Energy Information Administration and the United States Geological Survey regarding portions of the Council's report that address the methodologies used in developing and updating the Demonstrated Reserve Data Base. These two organizations are intimately involved and are the Administration's experts in those aspects. Rather, I wish to address the process of developing ideas for studies to be undertaken by the Council, the manner in which the Department of Energy requests studies and provides information for use by the Council in its reports, and the process that is used for responding to recommendations made by the Council on their reports.

Since September 4, 1985, when Secretary Herrington made his first study request to the NCC, the Council has provided six reports to the Secretary. Typically, the study request process proceeds as follows:

Topics for study by the National Coal Council evolve in two ways. First, and most commonly, Department of Energy offices are polled for their study suggestions for submission to the Council. The suggestions are provided to the Secretary for his consideration.

Second, the Council can seek approval of the Secretary of Energy to perform studies which they deem to be in the interest of the Department.

Once a study topic has been requested, the Council establishes working groups from their membership to conduct the studies. Upon request, information available through the Department would be provided to the Council, which the Council would reference in addition to a significant number of additional sources. The work groups would then submit their findings to the Coal Policy Committee for review and recommendation for finalization. After any revisions, the Coal Policy Committee would recommend that reports resulting from the study or studies be submitted to the full Council for approval. After full Council approval, the products would be transmitted to the Secretary along with any dissenting views.

The role of the Office of Coal Technology is to coordinate the solicitation of suggestions for studies from within the Department, and, through the Assistant Secretary for Fossil Energy, to make recommendations to the Secretary on studies to be performed. In addition, the Designated Federal Official participates in all public meetings by the full Council and the Policy Committee assuring Federal Advisory Committee Act provisions are adhered to by the Council.

After review by the Secretary, documentation on the Secretary's positions is presented to the Council.

On August 21, 1986, after the Office of Fossil Energy had polled other Department offices for study suggestions, the Secretary transmitted to the Council a request for two studies to be performed. The studies requested were "Improved International Competitiveness of U.S. Coal and Technologies" and "Conduct a Strenuous Critique of the Demonstrated Coal Reserve Data Base." In addition, the Council requested and the Secretary approved a study to examine the ability for coal to displace imported energy. The Coal Policy Committee recommended the pursuit of these studies to the Council on November 7, 1986, and the full Council undertook the studies on November 26, 1986. The Council established work groups from their membership to perform the studies, and the Department provided available information upon request. I operated as the Designated Federal Official at public meetings.

Findings from the work groups were submitted to the Coal Policy Committee for two of the studies (i.e., "Reserve Data Base" and "Improved International Competitiveness of U.S. Coal and Coal Technologies") on May 5, 1987, for consideration. The Coal Policy Committee reviewed the information, and with some modifications, reported it to the full Council in the form of draft reports.

The full Council voted on June 2, 1987, to submit the reports to the Secretary. The "Reserve Data Base" report was provided in final form to the Secretary in July 1987, and the "International Competitiveness of U.S. Coal and Coal Technologies" report was submitted in August 1987. We expect the third report on coal back-out of imported energy will be transmitted to the Secretary this coming December.

Now, I would like to turn specifically to the current assessment of the recommendations in the two reports which were most recently submitted. As many recommendations (such as performing studies which address economic impacts to recovering coal due to mine safety and surface mine reclamation regulations) involve lead responsibilities from other government agencies, the Secretary on August 21, 1987, transmitted the reports to Heads of all of the organizations which were referred to in the reports. These included: Department of Army, Interstate Commerce Commission, Environmental Protection Agency, Department of Transportation, Department of Commerce, Department of Labor, and Department of Interior.

The Secretary requested a response from these agencies on actions they would take regarding recommendations under their purview. We are currently acquiring their responses as well as synthesizing responses received from Department of Energy offices.

We will keep the Subcommittee informed of our response to the National Coal Council on their Demonstrated Reserve Base report.

I recognize I have presented a considerable level of detail on the procedures entailed in the development of a National Coal Council report; however, I wanted to demonstrate to you the commitment the Secretary, and through him, the Assistant Secretary for Fossil Energy has to making the most viable use of the body of talents and knowledge reflected in the National Coal Council's membership.

Clearly, we recognize the importance of the existence of the Demonstrated Reserve Data Base for policy making at all levels of government. That is why the Council was requested to assess it. The Council's recommendations in the Reserve Data Base Report will be seriously considered by the Department.

I would be pleased to answer any questions regarding this testimony.

Senator MELCHER. Thank you, Mr. Siegel. I think we would like to hear from Mr. Geidl first, and then what questions we have for either one of you we will direct after Mr. Geidl's testimony.

STATEMENT OF JOHN GEIDL, DIRECTOR, OFFICE OF COAL, NUCLEAR, ELECTRIC AND ALTERNATE FUELS, ENERGY INFORMATION ADMINISTRATION, DEPARTMENT OF ENERGY, ACCOMPANIED BY ROBERT SCHNAPP, CHIEF, COAL ANALYSIS AND FORECASTING BRANCH, ENERGY INFORMATION ADMINISTRATION

Mr. GEIDL. Thank you, Mr. Chairman.

Mr. Chairman, Senator Ford, my name is John Geidl. I am the Director of the Office of Coal, Nuclear, Electric and Alternate Fuels in the Energy Information Administration of the Department of Energy, or EIA as we refer to ourselves.

Accompanying me today is Mr. Robert Schnapp, who is the Chief of our Coal Analysis and Forecasting Branch.

I appreciate the opportunity to appear before you today to describe EIA's work and our data on the Demonstrated Reserve Base of coal, the DRB, in response to the report of the National Coal Council prepared for the Secretary.

I will discuss five specific areas. First, I will address EIA's responsibilities with regard to the DRB.

Second, I will tell you what we have done to improve the accuracy of the DRB.

Third, I will report on the state of EIA's coal reserves information and what we have done to make the DRB data base useful for EIA's coal supply policy analysis.

Fourth, I will discuss EIA's current efforts to improve the DRB data.

Lastly, I will comment on the findings and recommendations of the National Coal Council in its Reserve Data Base Report.

EIA published its first Demonstrated Reserve Base Report in May 1981 in response to requirements of section 801 of the Powerplant and Industrial Fuel Use Act of 1978. Section 801, which was repealed earlier this year, called for disclosure of the extent, characteristics and productive capacity of coal reserves or interest therein within the United States held by any person or government entity.

In addition, the 1981 DRB publication and subsequent annual updates represent the continuation of coal reserve data development functions that were transferred from the Bureau of Mines to EIA under the Department of Energy Organization Act of 1977.

We employ the same coal classification system used by our predecessor agency, which is in conformity with the Joint Geological Survey and Bureau of Mines Classification Agreement of November 21, 1973.

Let me quickly describe what the DRB is. Figure 1 of the chart over here on my left portrays the relationships of coal resources and reserves. Coal resources, the pie on the left, is the total of all coal, both identified and undiscovered, that are in place in the ground.

The Demonstrated Reserve Base represents that portion of the identified resources, the identified resources being the wedge out of the pie and the Reserve Base being the circle. It is based upon sufficient points of measurement to give a high degree of geologic assurance that the coal will occur within certain depth and thickness ranges.

The DRB is compiled from data contained in published or publicly available reports and computations or, in rare instances, from private holders of coal reserves.

Let me briefly call your attention to the little plug out of the donut or the hole in the donut. You note that we have labeled that recoverable coal. You touched upon that earlier.

Senator FORD. Somebody really had an innovative idea to make it come out like that. I will say that to you, Mr. Geidl.

Mr. GEIDL. It is the hole in the donut, Senator.

Senator FORD. Would you do me a favor? At this point in your testimony, describe what you mean by short tons. I know, but we need it for the record. You have a billion short tons?

Mr. GEIDL. It is 2,000 pounds versus a metric ton, which is 2,204 pounds, I believe.

Briefly stated, the DRB includes beds of bituminous coal and anthracite 28 inches or more thick, beds of sub-bituminous coal 60 inches or more thick that occur at depths to 1,000 feet and beds of lignite 60 inches or more thick that can be surface mined.

The DRB also includes thinner and/or deeper beds that are presently being mined or for which there is evidence they could be mined commercially at this time.

EIA has published annual updates of the DRB each year since 1981 for each state, coal rank and type of mining. Even if no other changes are warranted, the DRB figures are adjusted for cumulative depletion since the last update, which is generally estimated at two times recorded underground mine production and one and one-quarter times recorded surface mine production.

That means we believe about half of the DRB for deep coal and about 80 percent of the DRB for surface mineable coal can be recovered.

EIA coordinates with the U.S. Geological Survey, the lead agency for geologic and total coal resource mapping to obtain new resource data. Generally, new resource data obtained through the National Coal Resource Data System are readily available through the cooperative state geological agencies and are obtained from those agencies directly.

Since 1977, EIA has introduced new data into the DRB and revised earlier data. First, involving USGS and state geologists in the analysis and adaptation of new resource data, we published revisions in five major coal producing states.

Second, where legitimate differences between state and EIA assessments have come to light, we have worked closely with state geologists to improve our understanding and resolve discrepancies.

Third, where states have developed coal resource data in independent programs, EIA has reviewed, analyzed and incorporated published data that meet the DRB criteria.

Fourth, working independently, we have re-evaluated older data, resulting in revisions to state DRBs.

Let me describe the state of EIA's coal reserves information. I am not going to tell you our data are perfect, because they are not. But we do have a lot more to offer than the National Coal Council has considered. The state of information on the DRB is not limited to the tonnage of coal reserves.

Estimates of the quality and recoverability of reserves are also available. Since the DRB alone contains no integral field data on coal quality, a series of studies and adjustments to the DRB data have been made to coal to produce coal reserve quality data for use in the EIA coal supply analysis and forecasting.

EIA assembled, reviewed and consolidated available coal quality information such as the sulfur content of reserves published by the Bureau of Mines in 1975, the coal analysis file developed by the Bureau of Mines and maintained by the EIA and other coal quality data.

Using these coal quality data, we have estimated the distribution of the DRB by sulfur and Btu content, by depth of reserves and by coal producing region.

We also consider recovery rates and accessibility of reserves due to land use constraints and losses due to coal preparation to arrive at how much coal is available for use.

Our analysis and forecasting procedures are constantly being reviewed and updated to improve the results. Three updates have been made since 1977. The data files, documentation and model software have been published and made readily available to all interested parties.

Although the DRB follows a set of definitions, flexibility and professional judgment have been key factors in maintaining the data. Annual updates include depletion adjustments and consideration of changes in mining practices, bed thicknesses and overburden criteria, all of which keep the DRB from becoming a static summation.

Reports by others have sometimes been supplemented with information from mining records, drilling logs, geologic maps and cross-sections, stratographic studies or historical production data in order to make the adjustments necessary to incorporate the data into the DRB.

The NCC report did not tell you about the data we use for analysis and forecasting. In fact, they concluded we have none; but I thought you would like to know we have an extensive data base, and we have a solid capability to do coal policy analysis.

We believe a comprehensive data base covering measured resources, reserves, quality and other factors will be quite useful; however, we have tried to adapt and improve the data that are available under currently funded programs.

Now, what are we doing to improve the data? We recently commissioned a study to review past and present procedures for the derivation of the DRB and of DRB coal quality distribution; to identify and assess available data and to develop an improved methodology for revising coal quality distributions; and to test the resulting methodology in selected states. This effort should significantly improve our basic and applied DRB data.

We are continuing our liaison activities with the USGS and with state agencies so that we can evaluate new studies from whatever sources. In addition to new resource data, we evaluate information

on mining techniques and recovery rates and improvements in estimates of historical mining and recovery, whether through statistical data or mapping of mined out areas.

Finally, we will update the DRB as new information from the National Coal Resource Data System becomes available in compilations of sufficient area and coverage to replace some of the older data comprising the DRB.

I have a few brief comments on the NCC's findings and recommendations. The NCC report points out the need for improvement in the DRB in the areas of coverage, coal quality, terminology and coordination. We agree that improvements can and should be made in each of these areas. Our current efforts will go a long way toward these objectives.

Before the NCC recommendation for establishing interagency study groups is implemented, the objectives, anticipated results, costs and practicality should be examined carefully to determine if meaningful benefits would be achieved.

The NCC study properly recognizes that the resolution of problems that could significantly affect estimates of the DRB coal lies with the individual state agencies that make the resource and reserve estimates. Any course of action should be founded on this premise.

Changes in the terminology used to describe coal in the ground should be coordinated among all cognizant Federal and state agencies due to the wide use of the terminology. Documents such as the USGS bulletin, coal resource classification system of the U.S. Bureau of Mines and the U.S. Geological Survey could be used as a point of departure to determine if changes are warranted.

If information on coal reserves is to be substantially improved, coal producers, electric utilities, states, railroads, private citizens and owners of properties that contain coal must be willing to allow access to data which describe those reserves.

Our experience indicates that such information along with value data are the two types of proprietary data that these entities most resist disclosing.

The NCC study suggests the EIA has not clearly stated what coals are and are not included in the DRB. I disagree. Information is clearly documented in the EIA report, Demonstrated Reserve Base of January 1, 1979, published in May 1981.

Further, the criteria for inclusion have been summarized and referenced annually since 1982 in the publication entitled Coal Production.

Mr. Chairman, I purposely avoided comment on that portion of the NCC report which discussed the merit of the laws affecting the coal industry because EIA is not a policy-related agency. We are, however, well aware that the deliberation of policy alternatives requires valid and credible analysis and data.

We are deeply concerned about the accuracy of our data and inherent uncertainties in analysis and forecasting. I believe we provide an excellent service to these ends.

Mr. Chairman, this concludes my remarks. I and Mr. Schnapp will be pleased to address any questions you and Senator Ford may have.

[The prepared statement of Mr. Geidl follows:]

TESTIMONY

ON

U.S. COAL DEMONSTRATED RESERVE BASE (DRB)

JOHN GEIDL

DIRECTOR

OFFICE OF COAL, NUCLEAR, ELECTRIC AND ALTERNATE FUELS

ENERGY INFORMATION ADMINISTRATION

BEFORE THE

SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

SEPTEMBER 18, 1987

Introduction

Mr. Chairman and members of the Subcommittee, my name is John Geidl, and I am the Director of the Office of Coal, Nuclear, Electric and Alternate Fuels in the Energy Information Administration (EIA). I appreciate the opportunity to appear before you today to describe EIA's work and plans for the Demonstrated Reserve Base (DRB) -- the single most comprehensive source of information on the Nation's coal reserves -- particularly, in response to the report by the National Coal Council, recently submitted to the Secretary of Energy, on the accuracy of the DRB.

I will discuss five specific areas. The first is EIA's responsibilities in regard to the DRB. The second is the work that has been done by the EIA to improve the accuracy of the DRB and to make the data base useful for EIA's coal supply analyses, and the third is what the DRB is -- or what it is not. Fourth, I will discuss EIA's current efforts to improve the DRB. Lastly, I will provide comments on the findings and recommendations of the National Coal Council in its recent report, Reserve Data Base.

EIA Responsibilities for the DRB

When EIA published its first DRB report in May 1981, the agency was responding to requirements of Section 801 of the Powerplant and Industrial Fuel Use Act of 1978 (P.L. 95-620). Section 801, which was repealed earlier this year, called for disclosure ". . . of the extent, characteristics, and productive capacity of coal reserves, or interest therein, within the United States held by any person or government entity . . . ." In addition, the 1981 DRB publication and subsequent annual updates represent a continuation of coal reserve data development functions that were transferred from the Bureau of Mines, U.S. Department of the Interior, to EIA under the Department of Energy Organization Act of 1977 (P.L. 95-91). EIA employs the same coal classification system used by its predecessor agency, which is in conformity with the Joint Geological Survey - Bureau of Mines Classification Agreement of November 21, 1973.

Coal resources are the total of all coal, both identified and undiscovered, that are in place in the ground. The Demonstrated Reserve Base (DRB) of coal represents that portion of the identified resources that is based upon sufficient points of measurement to give a high degree of geologic assurance that the coal will occur within certain depth and thickness ranges. The DRB is compiled from data contained in published or publicly available reports and computations or, in rare instances, from

private holders of coal reserves. These relationships are shown in Figure 1.

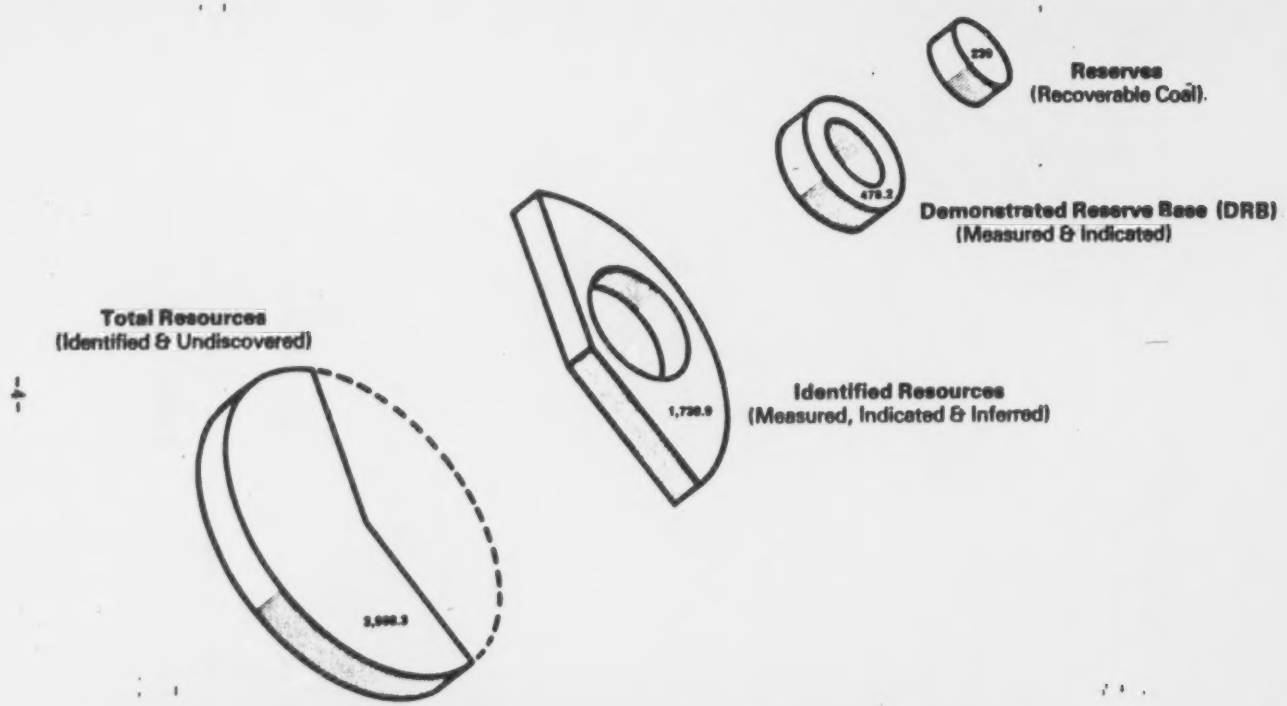
Briefly stated, the DRB includes beds of bituminous coal and anthracite 28 inches or more thick and beds of subbituminous coal 60 inches or more thick that occur at depths to 1,000 feet and beds of lignite 60 inches or more thick that can be surface mined. The DRB also includes thinner and/or deeper beds that presently are being mined or for which there is evidence that they could be mined commercially at this time.

EIA coordinates with the U.S. Geological Survey (USGS) -- the lead agency for geologic and total coal resource mapping -- to obtain new resource data. Generally, new resource data obtained through the National Coal Resource Data System (NCRDS) of the USGS are available more readily through the cooperating State geological agencies and are obtained from those agencies, with USGS concurrence, rather than from the USGS directly. Current and historical production records and mine production files may be used when new resource data are incorporated into the DRB, to factor out superseded resource data and cumulative depletion.

Summary of EIA Performance With the DRB

In late 1977, the EIA assumed responsibility for existing data files and derivations from the Bureau of Mines. In May 1981,

Figure 1. Delineation of U.S. Coal Resources and Reserves[a] (Billion Short Tons)



[a]This illustration portrays the theoretical relationships among all coal resource data. In practice, estimates of the DRB and Reserves are based on two sources: (1) comprehensive resource studies; and (2) site-specific studies that focus on readily recoverable coal, and which meet DRB and Reserve criteria without further augmenting the broader Identified or Total Resources data base.

Sources: Reserves are from Form EIA-7A; DRB is compiled by Energy Information Administration (EIA), both published as 1985 data, by EIA in "Coal Production 1985." Identified Resources and Total Resources represent remaining resources as of January 1, 1974, compiled and published by U.S. Geological Survey in "Coal Resources of the United States, January 1, 1974."

we published the DRB as of January 1, 1979, following a detailed State-by-State review of all derivations. Several State DRB's were revised at that time. With the 1979 DRB, EIA published the first detailed description of the DRB criteria and methodology, and documented the sources and derivations for each State DRB. EIA formally involved State geological agencies in the review of DRB figures and initiated the documentation of revisions due to errors or discrepancies discovered.

EIA has published annual updates of the DRB each year since 1981, for each State, coal rank, and type of mining. Even if no other changes are warranted, these DRB figures are adjusted for cumulative depletion since the previous update, which is generally estimated as 2.00 times recorded underground mine production and 1.25 times recorded surface mine production.

Since 1977, EIA has introduced new resource data into the DRB and revised earlier data. First, through significant involvement with USGS or State participants in the analysis and adaptation of new resource data, EIA published revisions in five major coal-producing States -- eastern Kentucky, Alabama, Illinois, Texas, and New Mexico. Second, where legitimate differences between State and EIA assessments have come to light -- for example, in Wyoming and Washington -- we have worked closely with State geological agencies to improve understanding and resolve discrepancies. Third, where States have developed

coal resource data in independent programs, EIA has reviewed, analyzed, and incorporated published data that meet the DRB criteria, as in Colorado, Missouri, South Dakota, Tennessee, and western Kentucky. And fourth, EIA working independently has reevaluated older data, resulting in revisions to State DRB's for Alabama, Arkansas, Georgia, North Carolina, Pennsylvania, and Virginia.

State of EIA's Coal Reserves Information

The information in the DRB is not limited to the tonnage of coal reserves. Estimates of coal quality and the recoverability of the reserves are also available. While the DRB alone contains no integral field data on coal quality, a series of studies and adjustments to the DRB have been made to produce coal reserves quality data for use in EIA coal supply analysis and forecasting. The EIA assembled, reviewed, and consolidated available coal quality information, such as the sulfur content of reserves published by the Bureau of Mines in 1975, the Coal Analysis File developed by the Bureau of Mines and maintained by EIA, and other coal quality data. Using these coal quality data, we have estimated the distribution of DRB by sulfur and Btu content, by depth of reserves, and by coal-producing region. EIA also considers recovery rates, inaccessibility of reserves due to land use constraints, and losses due to coal preparation to arrive at an estimate of how much coal is available for use.

Our analysis and forecasting procedures are constantly being reviewed and updated to improve the results. The distribution of coal quality in the DRB has been updated three times since 1977. The data files, documentation, and model software have been published and made readily available to all interested parties.

What the DRB Is: A Few Details

In essence, the DRB is a compilation of coal resource data that are sufficiently supported by measurement points to be considered "demonstrated" (measured plus indicated degrees of reliability) and that fall within categories of bed thickness and overburden thickness compatible with current minability criteria. Figure 2 portrays the identified coal resource classification criteria. The DRB is widely accepted because it fills a need for a national reserve base whose data are aligned with a consistent set of criteria.

The present advantage of the DRB hinges on the fact that it is based on data that are actually available now, while more ambitious data systems, such as the USGS National Coal Resource Data System (NCRDS), are still being developed. The EIA relies on geologic and resource mapping done by other agencies as the source of reliable data for the DRB.

Figure 2. Identified Coal Resource Classification Criteria

Identified Coal Resources Measured, Indicated and Inferred Categories 1/					
Mining Method and Depth (feet) / Rank and Thickness (Inches)		Anthracite and Bituminous Coal			
		Under 14	14 to 28	28 to 42	Over 42
		Subbituminous Coal and Lignite			
		Under 30	30 to 60	60 to 120	Over 120
Surface	0 to 200 2/	A 3/	B	C	D
Underground	200 to 1,000 2/	E	F	G	H
	1,000 to 2,000	I	J	K	L
	2,000 to 3,000	M	N	O	P

1/ Categories denote degree of geologic assurance as explained in the "Glossary." Excludes less than .02 percent of identified coal resources that is not classifiable under current criteria.

2/ Current surface minable coal is predominantly within the 0-to-200-foot depth range; some surface mines exceed this depth range. Conversely, some coal resources less than 200 feet deep can be mined only by underground methods.

3/ "Lettered" blocks represent combinations of rank, thickness and depth which define essential parameters for minability evaluations. Nonshaded blocks represent combinations for which measured and indicated resources are included in the DRB. Nonshaded partial blocks represent exceptions - combinations for which measured and indicated resources are included in the DRB in specified locations only.

Although the DRB follows a set of definitions, flexibility and professional judgment have been key factors in maintaining the data. Annual updates include depletion adjustments and consideration of changes in mining practices, bed thickness, and overburden criteria, all of which keep the DRB from becoming a static summation. Reports published by others have sometimes been supplemented with information from mining records, drilling records, geologic maps and cross-sections, stratigraphic studies, or historical production data, in order to make the adjustments necessary to incorporate the data into the DRB.

For the most part, the source data for the DRB do not include coal quality analyses or other resource characterization data that would be useful in applications such as EIA's coal supply analyses and projections. As noted earlier, EIA has sought out supplementary data sources to enhance the available data, usually through allocation, prorationing, and professional evaluation. We believe that a more comprehensive data base covering measured resources, reserves, quality, and other factors would be quite useful. However, we have endeavored to adapt and improve the data that are available under currently funded programs.

What the EIA is Doing to Improve the DRB

The EIA has recently commissioned a study to review past and present procedures for the derivation of the DRB and of DRB coal quality distribution, to identify and assess available data, to develop an improved methodology for revising coal quality distributions, and to test the resulting methodology in selected States. This effort should further improve our basic and applied DRB data.

We are continuing our liaison activities with the USGS and with State agencies, so that we can evaluate new studies from whatever source. In addition to new resource data, we evaluate information on mining techniques and recovery rates and improvements in estimates of historical mining and recovery, whether through statistical data or mapping of mined-out areas.

Finally, we will update the DRB as new information from the National Coal Resource Data System becomes available in compilations of sufficient area and coverage to replace some of the older resource data comprising the DRB.

Comments on the National Coal Council (NCC) Report

1. The NCC report points out the need for improvement in the DRB in the areas of coverage, coal quality, terminology, and coordination. The EIA agrees that improvements can and

should be made in each of these areas. Our current efforts will go a long way towards these objectives.

2. Before the NCC recommendation for establishing interagency study groups is implemented, the objectives, anticipated results, costs, and practicality of these groups should be examined carefully to determine whether meaningful benefits will be achieved.

3. The NCC study properly recognizes that the resolution of problems that could significantly affect estimates of the amount of recoverable coal lies with the individual State agencies which make the initial and revised resource/reserve estimates. Future actions to improve the DRB will necessarily require additional effort on the part of the State agencies.

4. Changes in the terminology used to describe coal in the ground should be carefully coordinated among all cognizant Federal and State agencies, due to the wide use of the terminology. Documents such as the USGS Bulletin 1450-B, "Coal Resource Classification System of the U.S. Bureau of Mines and U.S. Geological Survey," which contains the classification system, glossary of coal classification terms, and criteria for coal resource/reserve identification followed by EIA, could be used as a point of departure to determine whether changes are warranted.

5. If information on coal reserves is to be substantially improved, coal producers, electric utilities, States, railroads, private citizens, and the owners of properties that contain coal must be willing to allow access to data which describe those reserves. Our experience indicates that such information, along with value data, are the two types of proprietary data that private companies most resist disclosing.

6. The NCC study suggests that the EIA has not clearly stated what coals are and are not included in the DRB. I disagree. This information is clearly documented in the EIA report titled "Demonstrated Reserve Base of Coal in the United States on January 1, 1979," which was published in May 1981. Further, the criteria for inclusion have been summarized and referenced annually since 1982 in the EIA publication titled Coal Production.

Thank you for the opportunity to appear before you today. I will be happy to answer any questions you may have.

Senator MELCHER. Mr. Geidl, taking up on that last point, how are you going to find out how much coal reserve there is in Montana if you do not look at Alluvial Valley Floors, for instance, where you cannot mine?

Mr. GEIDL. We have, I think, an acceptable, reasonable and useful estimate of the coal reserves in Montana, Senator.

Senator MELCHER. Alluvial Valley Floors is not included, then?

Mr. GEIDL. It is included to the extent that it is included in the data that we have gotten from the USGS.

Senator MELCHER. You cannot mine it because the law says you cannot.

Mr. GEIDL. I do not know what depths you are talking, Senator, because we have a limit of a 1,000 level.

Senator MELCHER. You cannot mine in the Alluvial Valley Floors, period. So do you count it or not? That is my question. Did you count it?

Mr. SCHNAPP. Mr. Chairman, I cannot answer directly if that specific coal was included, but in general what we take into account is whether it is a surface or underground mine. We assume 80 percent of surface mines, and particularly out west we assume 90 percent can be recovered for surface mines.

We also take out a certain portion of the coal, depending upon the state, assuming that it cannot be mined due to whatever existing laws there are in the state.

Senator MELCHER. I guess we do need all these hearings, after all, because we have this longwinded report where you apparently do not know what you counted.

Mr. GEIDL. In the State of Montana, Senator, the report does not include the difference in the numbers in Montana, if I can address that. The report does not include the underground portion.

In this report, in our DRB measure, it is there. In Montana, the figure that is here, the 50,041 from the State Agency is the number that the state geologists reported for the surface portion. In our DRB, we include the underground portion, and that is what the difference is. The 50,041 is quite close to the number that we have in our published DRB, if we break the State of Montana into surface and underground mining categories.

Senator MELCHER. There is no underground mining.

Mr. GEIDL. There is underground coal, though, in the DRB.

Senator MELCHER. Well, there is no underground mining occurring. I guess it will not occur, but in the Alluvial Valley Floors, the law says you cannot strip mine.

Mr. GEIDL. It still counts in the DRB. There are other measures that we have of what is being mined.

Senator MELCHER. It is in there, then, even though it may never be available?

Mr. GEIDL. Correct.

Senator MELCHER. All right.

Now, I do not care who answers this, you or Mr. Siegel, but I want somebody to answer it.

What is Keystone?

Mr. GEIDL. May I address that, Senator?

Senator MELCHER. Okay.

Mr. GEIDL. Keystone is a private firm that publishes data. I do not know who uses it.

Senator MELCHER. By the way, our state uses it.

Mr. GEIDL. It is a big, thick set of books, and I know that many of the states, in response to the report, use Keystone figures.

I call your attention to many of these numbers going across from Keystone through USGS. That is not by coincidence. Keystone does not go out and collect their own data. They may update their data, but these figures came from government sources. In fact, they purchased this data from us at the Department of Energy.

Senator MELCHER. Well, then, the government is responsible.

Let us look at Montana and New Mexico. The 1974 and 1984 USGS was Montana, 291. What is that, 291 billion? What are we talking about, billion?

Mr. GEIDL. Those are billions.

Senator MELCHER. All right, 291 billion. The next line, New Mexico, 61 billion. Keystone for Montana is 50 billion; New Mexico, 182 billion.

If they got that from government figures, where did they get it?

Mr. GEIDL. For Montana, the 50,041 is surface only. Our figure for undergound and surface for Montana——

Senator MELCHER. First of all, is the Keystone figure supposed to be surface and underground?

Mr. GEIDL. I do not know. It is not identified here, but I believe in your state response, the letter may have referred to it as surface. There is a letter inside this book from the State of Montana.

Senator MELCHER. Well, this is your table.

Mr. GEIDL. It is not my table, Senator. This was put together by the National Coal Council.

Senator MELCHER. All right, it is not your table, but you say Keystone gets it from government figures?

Mr. GEIDL. Keystone originally got it from the USGS. Keep in mind that in the Keystone figures, there is a mix of resources and reserves.

If you will note at the top, the first four columns going across are labeled resources. The figures that you are referring to from the U.S. Department of Energy are our figures which are the Demonstrated Reserve Base, which follow the scheme over here on the chart.

Senator MELCHER. I guess you cannot explain to me why in Montana's case you go from USGS identified resources of 291 billion to Keystone, which has it at 50 billion. You go to the next line, and you go from USGS at 61 billion to Keystone at 182 billion in the case of New Mexico.

Mr. GEIDL. I cannot explain Keystone's number for New Mexico, Senator.

Senator MELCHER. Can we disregard it?

Mr. GEIDL. I do not use Keystone's number.

Senator MELCHER. The National Coal Council disregards it, and you disregard it.

Let us go over, then, to DOE 1984 and 1985. You have 120 billion, but the next line is New Mexico and that is 4 billion.

Mr. GEIDL. That is correct.

Senator MELCHER. If we can just totally disregard Keystone, and I take it that is exactly what you have done——

Mr. GEIDL. Keystone is not our source.

Senator MELCHER. You disregard it?

Mr. GEIDL. We do.

Senator MELCHER. So what we are looking at, then, in the last two columns is the Department of Energy's Demonstrated Reserve Base; is that correct?

Mr. GEIDL. Yes, sir.

Senator MELCHER. Since Secretary Harrington asked for the study of data resource base, what is the Department's response to the report? Just what you told us today, they want to do more?

Mr. SIEGEL. If you do not mind, I would like to try to answer that.

In fact, with this, as with the other reports that the National Coal Council has submitted to the Department, we try to be quite responsive to the recommendations that are made.

We are currently analyzing the recommendations within the Department to come up with a position that we can pass back to the National Coal Council. In fact we do agree that the findings made by the council, are accurate.

There is concern that the Reserve Data Base that is being used for policy analysis needs improvement and that policy decisions may be affected by whether or not this Reserve Data Base is correct.

We are looking right now to see if there are ways that the Department, with EIA as the organization that is responsible for the Reserve Data Base, can improve that data base and make it more useable.

Senator MELCHER. Well, do I have a correct understanding that besides the Department of Energy, that the U.S. Bureau of Mines and the USGS are the other principal Federal agencies involved?

Mr. GEIDL. For the Demonstrated Reserve Base, the Energy Information Administration is responsible for compiling and publishing the data.

But we do get data originally from the USGS, and the Bureau of Mines is not involved at this time. We inherited that activity from the Bureau of Mines.

Senator MELCHER. All right. You absorbed the Bureau of Mines activity?

Mr. GEIDL. The Bureau of Mines does, however, use our Demonstrated Reserve Base data files beyond the Demonstrated Reserve Base.

Maybe I have not made myself clear. The data that are used for modeling and policy analysis are not the data you're looking at in this report, Mr. Chairman.

Senator MELCHER. Yes, I got that from your last response.

But there are no other Federal agencies that we have to think about?

Mr. GEIDL. No, not as sources of this data, no.

There are a number of other Federal agencies that do make use of these data, however.

Senator MELCHER. Do you think that you've pretty well reached the point to where you can finalize your response to all of this?

Mr. GEIDL. The Department's response?

Senator MELCHER. Yes.

Mr. GEIDL. I do not address that aspect, that comes from the policy officials.

Mr. SIEGEL. Yes, we are fairly close right now. As I mentioned in my testimony, we did have the Secretary of Energy send letters to all the other agencies that were mentioned in this report, to ask for their comments.

We have not got those responses back yet, but in fact, we are very close to a departmental position on these recommendations.

Senator MELCHER. All right. How do you deal with economics in regard to assembling the information for the data resource base?

Mr. GEIDL. The economics of recovery?

Senator MELCHER. Yes, the economics of recovery.

Mr. GEIDL. That is not a term we like to use.

Senator MELCHER. You do not like to use that?

Mr. GEIDL. Economists define it slightly differently than it is commonly used. Mr. Schnapp might argue the point with me.

But to address it simply, there are a number of factors including quality and recoverability, that are taken into account in the assembly of the data base we use for policy analysis.

Senator MELCHER. How about sulfur?

Mr. GEIDL. Sulfur is also taken into account, Mr. Chairman.

Senator MELCHER. Are those the three main things, or is there something else?

Mr. GEIDL. Let Mr. Schnapp address that.

Mr. SCHNAPP. Sir, we take into account as many things as we can get reasonable data on. We start with the DRB, which is only the demonstrated reserve, not the recoverable reserve.

Then we take into account committed reserves, which are existing mines, and what those mine operators think that they can actually recover. Those numbers are published each year in our coal production report.

We also take into account overburden ratio, depth, seam thickness, and possible mine size, in order to estimate the cost of recovering the coal.

We also take into account the recovery factor, as well as additional percentages taken out for other laws, including state and local laws, and inaccessibility of coal due to faults or other obstacles.

So there are quite a number of things that we do take into account.

Senator MELCHER. My first question then: You cannot mine west of, what is it, the 100th meridian? You cannot strip mine coal in alluvial valley floors?

So what you are saying now is, that will have to come out.

Mr. SCHNAPP. And it does.

Senator MELCHER. And it does, but it is not yet out.

Mr. GEIDL. It is not out of these.

Senator MELCHER. Pardon me?

Mr. GEIDL. It is not out of this printed——

Senator MELCHER. Yes, it is not out of these figures.

Mr. SCHNAPP. I believe that the problem here is that there was a confusion between a demonstrated reserve base, which is what we

published, and recoverable coal, due to economics, and other restricting factors.

And those two are two very distinct things. It is the second one, the recoverable coal, that we take into account when we do all our analyses.

And that information and data are available to the public.

Senator MELCHER. One of you, Mr. Geidl or Mr. Siegel—I do not know which one—but it does not make any difference, testified that in the case of strip mining coal, you go down a thousand feet for subbituminous coal and lignite, and that is what you count.

With lignite you go down to the point where you can strip mine. What is the difference? Is that 1,000 feet too?

Mr. GEIDL. I also said there are exceptions to that.

Senator MELCHER. No, I am just going on the general statement that was made. I do not know which one made it. One of you made it.

Mr. GEIDL. 120 feet for lignite.

Senator MELCHER. 120 for lignite? I do not understand that.

Mr. SCHNAPP. That is what the USGS defines as part of the reserve base. That is the USGS definition.

Senator MELCHER. For subbituminous coals for strip mining, you count it if it is under 1,000 feet.

Mr. SCHNAPP. No, no. Again, this is a confusion between the Demonstrated Reserve Base and the coal that we would consider to be recoverable.

All of that coal, subbituminous going down to 1,000 feet, would be included in the Demonstrated Reserve Base.

Recoverable, strippable coal does not go down that far. Offhand, I cannot remember exactly what the number is for strippable coal.

But it is segregated out. You do not strip lignite down to 1,000 feet. You do not stripmine bituminous down to 1,000 feet.

Senator MELCHER. You have two arbitrary figures. For subbituminous coal that is strip mined, the arbitrary figure is 1,000 feet. For lignite, it is 120.

Mr. SCHNAPP. No, sir.

Senator MELCHER. It is not? Then what is it?

Mr. SCHNAPP. A thousand feet is for subbituminous coal to come into the Demonstrated Reserve Base, not to classify it as being strippable.

Senator MELCHER. Oh, all right. I missed that. So what you are saying is that it is no use counting lignite except up to 120 feet, because it is not going to be mined underground anyway.

Mr. SCHNAPP. Yes, sir.

Senator MELCHER. All right, that makes sense. Thank you very much.

Senator Ford?

Senator FORD. On your lignite, one of your big factors is economic. And basically, I guess, some lignite out west, John, in your area, maybe the Dakotas, the power generating facility is on site.

Mr. SCHNAPP. And in Texas, too.

Senator FORD. I was just trying to get on the good side of the Chairman here, to tell him I knew something about his country out there.

Senator MELCHER. Well, you have got North Dakota confused with Montana.

Senator FORD. No, no, I said, in Montana, North and South Dakota, that general area out there. More rocks in Montana.

Senator MELCHER. More subbituminous coal.

Senator FORD. Mr. Siegel, does the Department think there is adequate information on the quantity and quality of coal resources on which to base your current policy decisions?

Mr. SIEGEL. I will give you my own opinion that, in fact, we probably do have adequate information on the availability of coal on which to base those decisions.

There is no doubt, and I think the Department would agree, that improvements to the data base would be of great value.

Senator FORD. You do not think there is enough falling through the cracks but that your policy decisions will be adequate?

Mr. SIEGEL. I believe our information about coal is sufficient to support our policy decisions. My understanding is that coal is probably the best analyzed energy resource that we have in this country.

Senator FORD. And least used.

Mr. SIEGEL. We certainly would like to use more coal, there is no doubt about that.

Senator FORD. If you see any discrepancies in this information, what are they?

Mr. SIEGEL. Off the top of my head, I really cannot think of any great discrepancies. With this report from the National Coal Council, we certainly have concerns that we may be using data for policy analysis which shows more economically minable coal, than, in fact, we have.

But the fact remains, that even if we discount by 50 percent the amount of coal that is in the Demonstrated Coal Reserve Data Base, we still have a couple of hundred years worth of coal in the ground.

And as a result, I doubt that certain policy decisions would be affected.

When we analyze things like acid rain legislation, clearly we need to be concerned about more precise data.

Senator FORD. We get into a real economic question there, do we not?

Mr. SIEGEL. That is right, we certainly do.

Senator FORD. We are talking about billions and billions and billions of dollars you are going to impose on the taxpayer.

Mr. SIEGEL. That is right. That is certainly the case.

And as you know, we have analyzed many pieces of the acid rain legislation and have concluded that the costs would be very, very high. If, in fact, there is less low sulfur coal than our models and data bases currently show and our analysis were done using better data, it would increase the costs of acid rain control legislation, rather than decrease it.

Senator FORD. All right, that is one reason I asked Mr. Bellum about point nine.

Does this encourage you or discourage you as it relates to clean coal technologies with the information that you have?

Mr. SIEGEL. I am still very bullish on clean coal technologies, even more so with this report.

Senator FORD. So this report will spur it along a little bit in your mind?

Mr. SIEGEL. I certainly think so. Not only because acid rain control legislation is more costly than we have anticipated to date, but also because if we do not have coal that is economically minable right now, clean coal technologies, which are expected to be more efficient and less costly to utilize, would allow more coals to be utilized economically. Also, if we are running short on coal—and I don't think that is the case—but if we are, higher efficiency technologies should stretch out our coal reserves.

Senator FORD. Do you think we'll be here as a world 200 years from now?

Mr. SIEGEL. I certainly hope so.

Senator FORD. It is not our decision, I understand. But everybody talks about 200 years from now, and boy, we do not have to worry about a thing.

We need to worry just a little bit.

To what extent now is the DRB and related information incorporated into policy decisions by the Department?

Mr. SIEGEL. It certainly is an important ingredient in doing energy policy projections that are utilized in our national policy plans and in the analysis of regulations and laws that might have an impact on energy.

The Reserve Data Base is certainly utilized as a factor.

Senator FORD. Do you have any idea how long it would take to make the changes in the DRB to take care of the problems that were pointed out in your report, that would be necessary?

You are thinking. Give me a gut reaction off the top of your head, how about that?

Mr. SIEGEL. I would be speaking out of line. It is probably EIA.

Senator FORD. Well, EIA, I do not want to get out of line. I do not want you to be out of line. I want you to be proper.

Mr. Geidl, do you want to answer that question.

Mr. GEIDL. Senator, I frankly am not sure what you are talking about, the problems in the DRB data.

Senator FORD. Are you going to make any changes as a result of this study?

Mr. GEIDL. We are not doing anything as a result of the National Coal Council study. The National Coal Council study makes recommendations to the Secretary of Energy.

We are, as I said earlier, in the process of looking at the DRB, and the data which we use for analysis purposes, which are not the DRB addressed in this report, for improvements that we may make in terms of the various factors that are incorporated into our analysis file.

Senator FORD. I take it, your answer is no.

Mr. GEIDL. I just said we have a study underway for this. But I cannot respond to your question because this report is for the Secretary of Energy, and the recommendations that are made in it require an official policy response.

Senator FORD. Let us see if you can respond to this. In your testimony, you state that EIA does collect data on coal quality.

Mr. GEIDL. Yes, sir.

Senator FORD. What level of confidence do you have in your data, now?

Mr. GEIDL. We have a great deal of confidence in it.

Senator FORD. What is a great deal? 100 percent?

Mr. GEIDL. I would say 100 percent.

Senator FORD. 100 percent. All right, we will move on.

Then let me follow that up a little bit, the same thing I asked Mr. Bellum, tell me how much .9 sulfur coal we have?

Mr. GEIDL. I do not have the figure in my head, but we do have the figure. I can provide that for the record.

Senator FORD. I would be delighted to have it. How soon could I get that?

Mr. GEIDL. You can get that as soon as I get back to my office.

Senator FORD. That would be fine. I would love to have that right away.

[The information follows:]

Department of Energy
Washington, DC 20585

Honorable John Melcher
Chairman, Subcommittee on Mineral
Resources Development and Production
Committee on Energy and Natural Resources
Washington, D.C. 20510

Dear Mr. Chairman:

Thank you for the opportunity to provide witnesses to testify before the Subcommittee on Mineral Resources Development and Production hearing on the National Coal Council's Reserve Data Base Report on Friday, September 18, 1987.

At the hearing, Senator Ford asked to be provided with the amount of available coal that contains less than 0.9 pounds of sulfur per million Btu. Enclosed are six tables each of which is divided by Btu and sulfur content for all types of mining (i.e., deep and surface mines). The enclosed tables are for the following categories:

Table 1. Aggregate U.S. Demonstrated Reserve Base
Table 2. Aggregate U.S. Recoverable Reserves
Table 3. East Kentucky Demonstrated Reserve Base
Table 4. East Kentucky Recoverable Reserves
Table 5. West Kentucky Demonstrated Reserve Base
Table 6. West Kentucky Recoverable Reserves

If there are additional questions concerning this information, please contact John Geidl on 586-9880.

Sincerely,

for L. C. Pettis
Dr. H. A. Merklein
Administrator
Energy Information Administration

6 Enclosures

cc:
Honorable Wendell H. Ford
United States Senate

Honorable Chic Hecht
Ranking Minority Member

Table 1. Aggregate U.S. Demonstrated Reserve Base
(Million Short Tons)

	SULFUR CONTENT						
	0.00-0.40 LBS/MMBTU	0.41-0.60 LBS/MMBTU	0.61-0.83 LBS/MMBTU	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB
BTU CONTENT							
>= 26 MMBTU/TON	2698.20	17696.80	8050.80	15720.20	11731.00	4655.90	60552.90
23-25.99 MMBTU/TON	3631.80	7281.20	10501.30	14609.20	23702.20	32300.20	92025.90
20-22.99 MMBTU/TON	2707.70	4565.80	3028.50	6480.80	12410.00	64343.10	93535.90
15-19.99 MMBTU/TON	66345.40	46699.10	39543.30	22791.20	4435.10	944.90	180759.80
< 15 MMBTU/TON	2457.20	4748.20	12874.60	16893.60	7931.80	1935.40	46840.80
TOTAL	77840.30	80991.10	73998.50	76495.00	60210.10	104179.50	473714.50

Table 2. Aggregate U.S. Recoverable Reserves
(Million Short Tons)

	SULFUR CONTENT						
	0.00-0.40 LBS/MMBTU	0.41-0.60 LBS/MMBTU	0.61-0.83 LBS/MMBTU	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB	NATIONAL DEEP & SURFACE DRB
BTU CONTENT							
>= 26 MMBTU/TON	1499.22	9905.00	4490.76	8718.44	6388.13	2549.83	33551.38
23-25.99 MMBTU/TON	2031.06	4103.58	5569.35	7717.26	12052.85	16920.72	48394.82
20-22.99 MMBTU/TON	1519.25	2582.17	1667.88	3394.87	5817.33	31003.72	45985.21
15-19.99 MMBTU/TON	38821.25	27092.05	24055.50	14068.55	2940.19	529.92	107507.46
< 15 MMBTU/TON	1896.51	3665.87	10088.14	13254.36	6293.36	1511.50	36709.73
TOTAL	45767.28	47348.67	45871.61	47153.49	33491.85	52515.70	272148.60

Table 3. East Kentucky Demonstrated Reserve Base
(Million Short Tons)

	SULFUR CONTENT						
	0.00-0.40 LBS/MMBTU	0.41-0.60 LBS/MMBTU	0.61-0.83 LBS/MMBTU	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES
BTU CONTENT							
>= 26 MMBTU/TON	371.70	3507.20	1571.20	751.90	346.40	88.40	6636.80
23-25.99 MMBTU/TON	95.90	813.50	1488.00	792.20	114.10	149.30	3453.00
20-22.99 MMBTU/TON	.	.	125.70	241.00	.	67.20	433.90
TOTAL	467.60	4320.70	3184.90	1785.10	460.50	304.90	10523.70

Table 4. East Kentucky Recoverable Reserves
(Million Short Tons)

BTU CONTENT	SULFUR CONTENT						
	0.00-0.40 LBS/MMBTU	0.41-0.60 LBS/MMBTU	0.61-0.83 LBS/MMBTU	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES
>= 26 MMBTU/TON	205.59	1936.08	864.82	417.80	191.77	48.63	3664.68
23-25.99 MMBTU/TON	53.09	452.72	833.64	445.38	64.49	83.62	1932.94
20-22.99 MMBTU/TON	.	.	71.79	137.09	.	37.58	246.47
TOTAL	258.68	2388.79	1770.25	1000.27	256.26	169.83	5844.09

Table 5. West Kentucky Demonstrated Reserve Base
(Million Short Tons)

	SULFUR CONTENT			
	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES
BTU CONTENT				
>= 26 MMBTU/TON	.	254.33	108.28	362.60
23-25.99 MMBTU/TON	120.20	1406.14	5422.80	6949.14
20-22.99 MMBTU/TON	45.20	1390.67	1756.87	3192.74
TOTAL	165.41	3051.13	7287.95	10504.49

Table 6. West Kentucky Recoverable Reserves
(Million Short Tons)

	SULFUR CONTENT			
	0.84-1.67 LBS/MMBTU	1.68-2.50 LBS/MMBTU	> 2.50 LBS/MMBTU	TOTAL
	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES	REGIONAL DEEP & SURFACE RESERVES
BTU CONTENT				
>= 26 MMBTU/TON	.	521.90	224.20	746.10
23-25.99 MMBTU/TON	212.80	2728.00	10932.00	13872.80
20-22.99 MMBTU/TON	78.20	2708.30	3479.70	6266.20
TOTAL	291.00	5958.20	14635.90	20885.10

Senator FORD. The National Coal Council's report states that the DRB makes no provision for the exclusion of coal that is unminable due to mining of adjacent seams, or coal lost during mining or preparation of the coal, or for coal lost to competing land use.

Do you agree with this?

Mr. GEIDL. That is exactly correct, sir. Plus, if I might add, what they have described is recoverable reserves, which we also have analyzed, but which they have confused and have not addressed in this report.

Senator FORD. To what extent do you rely on information from the States?

Mr. GEIDL. A great deal. All of the original base information, Senator, that went into the compilation of the DRB, plus the periodic updates, of which there have been as many as 11 or 12 from the States including both eastern and western Kentucky, comes from the States. We rely a great deal on the States' geological survey people.

Senator FORD. Not just Kentucky, but other States?

Mr. GEIDL. Many States.

Senator FORD. It is across the board?

Mr. GEIDL. Across the board, nationwide.

Senator FORD. When will the study on the DRB commissioned by EIA be completed?

Mr. GEIDL. In about a year, Senator.

Senator FORD. About a year? Next Christmas?

Mr. GEIDL. Christmas is a little sooner than next year. About next summer.

Senator FORD. Next summer? I was talking about Christmas next year, the 1988 Christmas.

Mr. GEIDL. It is underway now.

Mr. SCHNAPP. The summer of 1988.

Senator FORD. Summer of 1988? You indicate there is some information—I asked Mr. Bellum this—there is some information on coal reserves not available due to proprietary nature.

To what extent is that a problem?

Mr. GEIDL. Senator, I did not say they are not available. I said, it is the most difficult to collect.

Senator FORD. Well, that is just bureaucratic language for you cannot get to the stuff, is it not?

Mr. GEIDL. Well, it is refused on the basis of proprietary information.

I recall Mr. Bellum's answer that adequate information is in the public domain. That is the answer you get when you go for that kind of proprietary information, not just in coal, but in dealing with all those kinds of data that are so important to competition in the industry.

Senator FORD. Is that not in all industries?

Mr. GEIDL. Correct.

Senator FORD. Can you take a percentage factor, what might be left out of that information you try to collect?

Mr. GEIDL. I do not understand the question.

Senator FORD. Well, proprietary information is something that is very difficult for you to secure. Is there some kind of percentage

from the public domain that you could add to that to make up for whatever proprietary information you did not receive?

Mr. GEIDL. Well, what we are talking about here is the information on sulfur and what is available, and the people that know that best are the people who own those resources.

For example, if you want to know what is really going on in the industry, in order to respond or to get ready to supply a major market for low sulfur coals, the people to find that out from are the people assembling the properties.

Now if you try to ask that kind of question, the industry will not recommend that you do so. And if you try to assemble a data collection to have that effect, you will be met with a great deal of resistance from the industry, and understandably so.

But this is the very kind of information that needs to improve, and it must come from the horse's mouth, rather than us getting it ourselves. That is what you have to go after.

Senator FORD. How much of a detriment is this lack of information to agency policy?

Mr. GEIDL. To agency policy?

Senator FORD. If you are unable to get all this particular data, how much does that deter, or how much does that put a question or a cloud over policy that would be determined by the Energy Department?

Mr. GEIDL. There is always a certain amount of uncertainty, perhaps a great deal of uncertainty, in any forecasting and analysis that you do with these models and this kind of data.

I cannot quantify that. It just has to be recognized, that when the policy is made, it is made upon data of a certain level of uncertainty.

And the uncertainty begins with the geology.

Senator FORD. Can you make those of us in politics understand that when you take a political poll, or those in business take a poll, it has a factor of plus or minus three.

And do you put a plus or minus three, or a plus or minus ten percent?

Mr. GEIDL. On our analysis? We do not do that.

Senator FORD. You are 100 percent. I heard you say that awhile ago. And I want to know if you have hedged that bet a little bit.

Mr. GEIDL. I have 100 percent confidence in our work.

Senator FORD. In the information that you have received, that the information you put out is 100 percent accurate. But you do not have all the information.

And so therefore when you do not have all the information, you are not absolutely correct, and you left the false impression that you are 100 percent right, then you put "however."

You belong to the let's-just-wait-a-damn-minute-here club, you know. I want to be sure. I heard that yesterday, and I became one of the charter members.

With the information you have, you are accurate, but you do not have all the information, is that correct?

Mr. GEIDL. We have, in our analysis file, the breakdowns of sulfur by various categories. Was that collected directly? No. It was derived from many sources.

Senator FORD [presiding]. Maybe one day I can get you in the office and talk.

Anybody have any closing statement?

Mr. SIEGEL. Senator Ford, if you do not mind, I certainly do not want to leave the impression here that this report is not going to be seriously considered by the Department.

I certainly have no control over the changes that EIA will make to their data base as a result of this report. And as I said, they are the experts on that Reserve Data Base, and can best pass judgment on what the National Coal Council says about their reports.

The fact is, however, we are taking this report extremely seriously. In fact, we have already taken a couple of steps that are in line with what the National Coal Council recommended.

In particular, the National Coal Council has pointed out the effect that new regulations and laws might have on the Reserve Data Base. The availability of economically minable coal, is something that we routinely, in the Department of Energy, assess. As a result of this we are now looking at methods to make the data base a much more important part of any analyses that the Department does of pending laws and regulations.

We have, for example, recently communicated to the Department of Interior our concerns about some regulations that they are proposing and that were mentioned in the Reserve Data Base report. Our concerns are with the effect that the regulations will have in view of the availability of economical coal.

So we are going to take the report very seriously.

Senator FORD. Anything else?

Mr. GEIDL. Senator, I have no closing remarks. I do thank you for the opportunity to comment.

Senator FORD. We thank you for coming. It has been a joy to have you, and I look forward to working with you in the near future.

[Subsequent to the hearing the Department of Energy submitted the following:]

rec. 10/20

Department of Energy
Washington, DC 20585

October 20, 1987

Honorable John Melcher
Chairman, Subcommittee on Mineral
Resources Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Thank you for your letter of September 28, 1987, to John Geidl, concerning the September 18, 1987, hearing record, and your request for a response to the following question:

> What percentage of the total (a) Demonstrated Reserve Base and (b) recoverable reserves would be in compliance at emission standards of 0.6 through 1.2 pounds of SO_2 per million Btu for Kentucky? For the United States?

Because our categories of sulfur content of coal do not coincide with the requested 0.6 through 1.2 pounds of SO_2 per million Btu, we have provided in the enclosed tables our estimates of the share of compliance coal at emission standards of (a) 0.8 pounds or less of SO_2 per million Btu, (b) 0.8 through 1.2 pounds of SO_2 per million Btu, and (c) 1.2 pounds or less of SO_2 per million Btu.

If there are additional questions concerning this information, please contact John Geidl at 586-9880.

Sincerely,

for L. A. Latta
Dr. H. A. Merklein
Administrator
Energy Information Administration

Enclosure

cc:
Honorable Wendell H. Ford
United States Senate

Honorable Chic Hecht
Ranking Minority Member

Celebrating the U.S. Constitution Bicentennial — 1787-1987

Table 1. Percent of Demonstrated Reserve Base in Compliance for Various Emission Standards

	Less than 0.8 pounds	0.8 - 1.2 pounds	1.2 pounds or less
Kentucky	1.5	13.8	15.2
Eastern Kentucky	4.4	41.1	45.5
Western Kentucky	.0	.0	.0
United States	16.4	17.1	33.5

Note: Total for 1.2 pounds or less may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Resource Allocation and Mine Costing Model.

Table 2. Percent of Recoverable Reserves in Compliance for Various Emission Standards

	Less than 0.8 pounds	0.8 - 1.2 pounds	1.2 pounds or less
Kentucky	1.6	14.6	16.2
Eastern Kentucky	4.4	40.9	45.3
Western Kentucky	.0	.0	.0
United States	16.8	17.4	34.2

Note: Total for 1.2 pounds or less may not equal sum of components due to independent rounding.

Source: Energy Information Administration, Resource Allocation and Mine Costing Model.

Senator FORD. The last panel will be Doyle Frederick and Donald C. Haney, and they will be accompanied by Harold Gluskoter and James C. Cobb.

Mr. Frederick was associate director of U.S. Geological Survey, Department of the Interior, and Don Haney is a Ph.D. and director and state geologist, Kentucky Geological Survey, at the University of Kentucky.

The Kentucky people can understand that the crowd has diluted considerably after the departmental bigwigs leave. They have enough backup here to take care of the university and overflow.

We will let Mr. Frederick go first, and then Dr. Haney. And your statements will be included in the record in full, and you may want to highlight it and then we can get in some questions.

It is regrettable that I have to leave here around noon, or 12:00 o'clock. We have about 35 or 40 minutes.

So Mr. Frederick, if you want to proceed, why, we look forward to your testimony.

STATEMENT OF DOYLE G. FREDERICK, ASSOCIATE DIRECTOR, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY DR. HAROLD J. GLUSKOTER, CHIEF, BRANCH OF COAL GEOLOGY

Mr. FREDERICK. Thank you, Mr. Chairman. It is a pleasure for me to be here today to comment on the U.S. Geological survey activities related to the issues that have been discussed by the committee and by the witnesses this morning.

I am accompanied by Dr. Harold Gluskoter, who is the chief of our coal branch in our geologic division.

With your permission, I would like to make a few opening statements, and I will keep those brief. But then I would like to ask Dr. Gluskoter to talk to you a bit about a project that we have in cooperation with the State of Kentucky that we believe directly relates to many of the issues that were discussed this morning.

So with that, let me just say a little bit about the Geological Survey's testimony today. We really are not here to criticize the demonstrated reserve base.

What we would say, basically, is that there are additional factors that ought to be included. And I believe EIA suggested in their analysis approach they did include some of those.

It was not in the demonstrated reserve base, but it was available to the public.

What we will say is that we are looking at providing information, technology, and analysis tools that would help the EIA or others sharpen that information that could be taken from a resource base in the beginning or from that demonstrated reserve base.

And Dr. Gluskoter will talk about that specific project in just a few minutes.

We do believe that there are additional geologic, geochemical, environmental, land use, and economic factors that ought to be included in our analysis of what one realistically ought to believe is there and might be extractable.

And as far as the Coal Council recommendations are concerned, we agree with that point, that point being that it would be very useful to have in place a standardized and systematic approach that would take into consideration those additional factors.

So it is kind of on that basis that we have constructed our testimony this morning.

Now, just a little bit about the U.S. Geological Survey. We cannot resist that at any one of these sessions.

But we would like to say that we are charged with providing for the Nation information on the resources of the country. And we like to describe those in terms of the earth science related resources.

And those run the gamut from water resources to energy and mineral resources.

And we have been at it about 100 years, and kind of think that there are some expertise, capability, data, that we have available to us that could be useful to this discussion.

Specifically, about 12 years ago we began the development of the National Coal Resources Data System, and that data system has been mentioned a few times this morning.

That was done in cooperation with the States, as we believe the States had considerable expertise, and they have access to a great deal of information.

It has evolved over time into a complex situation that includes not only information on the quality and quantity of coal for the country, but also has a very powerful computer analysis capability that lets us put that information together with the other factors that we discussed here this morning in analyzing what might be extractable in terms of coal.

And we are using that in the final project.

We have right now cooperative agreements with 21 coal producing States in the NCRDS.

Now, turning more specifically to the issue at hand, we began about a year ago, with the State of Kentucky, and specifically with Don Haney, State Geological Survey, a pilot program that has been mentioned already.

I believe you gave half of my testimony a little earlier. But specifically, in Pike County, Kentucky, we are looking at not only what can we see there in the 20 different coal seams, in terms of what one sees in a resource or a reserve base, versus what one reasonably could expect to mine.

We are looking at that to see what we can see there. We are also looking at it to make sure that we can develop a technique that will be not only useful there in the Appalachian area of the country, but also to be used in cooperation with the State and industry folks throughout the country.

So we have a twofold objective in that pilot study. We are using data handling capabilities of our geographic information systems, and the State of Kentucky and we are integrating those data bases with our coal resources information, again, quality and quantity information, with the many factors, competing land use, geologic factors, minability, economics, and that sort of thing, to come to some figures that we believe might be very helpful in terms of understanding what one could practically expect to get out of the ground.

And we are continuing that pilot project, and we have gone part way through, and we think there are some useful preliminary results that we can give you today, and I will ask Hal to do that in just a minute.

Let me at this point kind of wind up my presentation and then turn it over to Dr. Gluskoter.

We think, as an example, that we have proven that the system will work if we have good information, and information that is consistent.

We think it will work in Kentucky, Virginia, West Virginia. We also think it will probably work in other parts of the country.

So with that, let me say, it is our intent to finish the pilot project in Kentucky working with the State Geological Survey. We are also in conversation with the State Geological Surveys in West Virginia and Virginia, and would expect to continue pilot projects in those States in the next two or three years, our objective for those being to take a look at the specific areas that they are interested in that we might be interested in, but to test our analytical tools and to develop a practical approach whereby we can look at a selected number of quadrangles for each area, and predict statistically based on that rather detailed set of analyses what one would expect for the entire area.

And with that approach, if it is okay with you, Mr. Chairman, I will ask Dr. Gluskoter to run through the brief description of the pilot project.

Senator FORD. Yes, sir. Doctor, you may proceed.

STATEMENT OF DR. HAROLD J. GLUSKOTER, CHIEF, BRANCH OF COAL GEOLOGY, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Dr. GLUSKOTER. I will and project so that I can stand here and point at the same time.

The coal fields of the coterminous United States are shown, with apology to Alaska. But the coals of the United States are widespread, and the total amount in the ground is large.

Knowing the total amount in the ground is extremely important, but perhaps not as important as knowing the amount which is currently available for mining; a much more useful number.

Because of that, we have initiated this pilot study with Bob Rachel at the Kentucky Geological Survey at the Matewan Quadrangle, Pike Country, Kentucky.

It is the location here, southeastern Kentucky, very close to the point where West Virginia, Virginia and Kentucky meet.

The area was chosen because of the importance of mining to the area; because there is a sufficient amount of data available to conduct the study there.

And third, we think we will be able to extrapolate the results a reasonable distance. We are not just doing an isolated area.

We begin with original coal in the ground, but what we want is the available coal, the available coal resource.

So from the original coal we subtract that which has been mined out. We subtract those restricts that are related to the environment, the land use restrictions.

We subtract technological restrictions, geological restrictions. And then the result is the available coal resource.

In Matewan Quadrangle, which is about an area of 55, 60 square miles, there are 20 mineable seams, mineable coal beds. They all have approximately this configuration, of a nearly flat line.

But the surface as you said is not—it is very regular. So the coals crop out at the surface and can be surface mined in part.

And under those hills, they can be underground mined.

The coal shown in red represents the Upper Elkhorn No. 2 coal beds. Middle of the sequence, with additional poles above it and poles below it.

And we are going to run through a brief analysis of Upper Elkhorn No. 2.

Senator FORD. Let me ask you a question, if I may. You have got 0 to 300 feet.

Now, zero to me would have been on the surface and the 300 feet would be below the surface. Why is it that way?

Dr. GLUSKOTER. I believe our data was probably sea level.

Senator FORD. Sea level?

Dr. GLUSKOTER. Or it may be an arbitrary data, I'm not sure.

Senator FORD. I think you would have to go a little deeper than that.

Dr. GLUSKOTER. This represents a cross section across one part of Pike County. And that is why we took the section. There was 200 feet of relief.

Senator FORD. OK. Well, it would be more like 3,000 feet to sea level. I am trying to understand. I am in an arena I do not know much about. I have to take the information from others.

Dr. GLUSKOTER. This map is of the Matewan Quadrangle. And the area shown in white would be underlain by the Upper Elkhorn No. 2 coal.

The area in gray, there is no Upper Elkhorn No. 2. There are actually three valleys that have eroded naturally below the coal fields.

So the area in white is where we have the Upper Elkhorn No. 2. Now, what we are going to do is run through some of these various parameters that we want to subtract from the total coal, and then we will progressively change the picture.

The restrictions that we show will be shown in red, and then in subsequent views, what had been red will also become a gray.

Here we have plotted the active and abandoned surface and underground in the Upper Elkhorn No. 2 coal only. But these are the area of the Matewan Quadrangle where Upper Elkhorn has been or is currently being mined.

The deeper red, the underground mines; the lighter peach color, surface mines.

In this view, what had been red on the previous one is now gray, and we have shown a number of land use considerations that we have now removed from our total coal resource.

Power lines cutting through the area. Pipelines cutting through it. These would be restrictions on surface mines primarily.

Streams, mining limits on streams. Areas that are fairly heavily populated that would not be mined through. Oil and gas wells. Cemeteries.

This area of central Appalachia has historical interest. Two of the cemeteries we are indicating here have the Hatfields and McCoys.

Senator FORD. You will notice they are separated by a great distance.

Dr. GLUSKOTER. So those would be removed from surface mining.

The next view then shows some geological restrictions that would restrain underground mining primarily of the Upper Elkhorn No. 2.

Abandoned mines in coal beds which underlie this area within 40 feet.

And the major factor shows up here is, if there is coal either 40 feet above or below the Upper Elkhorn No. 2 it is a better candidate for being mined.

Modern technology will not allow us to take both of them. Current technology. So one has to disappear from our resource. In this case, the Upper Elkhorn No. 2.

Senator FORD. There is a remining. Do you take that into consideration? Once you get the seam out, then you can go in and remine it.

I have been trying to get some test projects that you would return the soil to original contour, whatever it might be, in the remining, and then go back in and tear all that out and go for another mine.

But you do take that into consideration, the remining?

Dr. GLUSKOTER. That would come into this. Because the remining is where you had shallow underground mines, and now we would include what is left.

And typically what is left is for surface mining.

Mr. FREDERICK. Just one point, Mr. Chairman. The capability of the system would allow one to come back and take those technologies and economies into account, if the situation changes.

And that is one of the points that I think we would make about the utility of the system itself, as well as the data base. One could take those into account, if one chooses.

One can ask what-if questions, what if I could? What would that mean? What if I left this out? What would that mean to the policy I am pursuing.

Senator FORD. Thank you.

Dr. GLUSKOTER. This view, we have reversed the color schemes for ease of viewing. Now, the coal which is available for mining is shown in color, and the white, where the coal is not available.

The surface mineable coal is shown in the peach color, and the orange, underground mineable coal. We did the Upper Elkhorn No. 2.

Now, there is one factor which I have not mentioned which could be considered using this GIS system. And that has to do with coal quality.

The reason I have mentioned it is that this is pretty good quality coal. This area is almost entirely compliance coal.

The little half moon area that I have overlaid on the base is the only part of the Upper Elkhorn No. 2 that would not meet new source compliance standards. But it is available within the system, within the GIS.

Senator FORD. And that is what, 28 million tons?

Dr. GLUSKOTER. No, the 28 million tons, I will come to that, is the available resource.

But all of that is this compliance coal. And I am just showing this as an example of the ability to put sulfur content into the picture, to use that parameter; although we did not do it.

In the Matewan Quad, half the coal will not meet required standards, so that will be factored in.

Senator FORD. And your surface mining is along the edge. And did you take into consideration above 33 degrees, or above 30 degrees, and under 30 degrees, and whether you could mine? All of that?

Dr. GLUSKOTER. Yes, the advantage of working so close with the State is that those kinds of parameters can be taken into consideration, as those changes took place.

Senator FORD. You let the real world have some input into the technical world.

Dr. GLUSKOTER. We sure hope so.

Senator FORD. All right, that is the only one I know.

Dr. GLUSKOTER. In summary, if this rectangle was the original coal resource, that is, 106 million tons of the Upper Elkhorn No. 2, that is original resource, as you said, 14 million tons have been mined, leaving us a remainder resource of 92 million tons, and then an available resource, after we subtract everything we have gone through, we come up with available resource of 28 million tons.

And that is broken out into strip coal, or 30 percent of what we started with.

We believe this is representative, although the range is going to be greater as we go from this group to different coals. But this is a reasonable kind of numbers, and we expect we will find numbers similar to this as we extend the study.

Senator FORD. But doctor, it appears here—I am following you here—it appears that you lose a tremendous amount of underground resources, deep mining, in millions of short tons as you have it there.

And the available shortage for surface mining, you lose very little.

Dr. GLUSKOTER. Yes, and the reason for that in this case, is that beneath the Upper Elkhorn No. 2 is the Upper Elkhorn No. 1, which is good quality coal and is a better candidate for mining.

So that is where the underground resource, most of it went. On the surface, because of the configuration is, you can mine both the Upper Elkhorn No. 1 and the No. 2.

Senator FORD. Well, if I look at blue as original resource, 30 percent; remaining resource is 27 percent; and then with your study, the available resource is 23. That is under surface mining.

Of course you only have 23 million tons. Of course that will take 46 small operators—no, 115 small operators.

Dr. GLUSKOTER. That is still the available resource, not the recoverable. We have not put in the recovery factors input, or some other local economics that might.

Senator FORD. But you are beginning to squeeze it in some. And when you go from 65 to 5, is that economics or what?

Dr. GLUSKOTER. The major factor, the economic, the mining, the seam below—the bed below the Elkhorn No. 2, it is that coal when we analyze the Upper Elkhorn No. 1, below it, when we finished that analysis, a much larger percent of that will remain in the deep mine.

It is just a thicker——

Senator FORD. Your original resource is 106 million, and your available is 28, and yet you have to factor in some other things before you get to it?

Dr. GLUSKOTER. Yes, sir.

Senator FORD. All right, is that it?

Dr. GLUSKOTER. Yes.

[The prepared statement of Mr. Frederick follows:]

STATEMENT OF DOYLE G. FREDERICK, ASSOCIATE DIRECTOR, U.S. GEOLOGICAL SURVEY
before the
SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
September 18, 1987

Mr. Chairman, I am pleased to be here to discuss the activities of the U.S. Geological Survey (USGS) as they relate to data on the availability of coal resources of the United States. I am accompanied by Hal Gluskoter, who is Chief of our Branch of Coal Geology.

According to the Energy Information Agency's forecast of the demonstrated reserve base, the United States currently has 488 billion tons of coal in a reserve base that is, at least theoretically, accessible for mining. Recently though, several groups, including the National Coal Council, have suggested that the actual amount of available coal is considerably smaller.

There are geological, geochemical, environmental, and technological factors, beyond those normally considered in the calculation of the demonstrated reserve base (DRB), that determine how much of the Nation's total coal resources are actually available for mining. Considering this fact, the Coal Council has concluded that it is important to know more about the constraints and their impact on our ability to make use of the Nation's coal resources. Further, they have suggested that more quantitative standards be developed and that techniques for their use be demonstrated. We agree that it would be very useful to have in place a standardized and systematic approach that would take into consideration additional, pertinent factors.

Improved data on available coal resources, like other basic earth-science information, is essential for policymakers to have in considering issues that range from the regional and national impacts of acid rain and energy independence to assisting local agencies in determining placement of sewage-treatment plants and other community facilities.

The U.S. Geological Survey is charged with the responsibility for assessing the coal resources of the Nation and has been involved in such activities since its inception over 100 years years ago. With the advent of modern computers, the National Coal Resources Data System was established and, in cooperation with State Geological Surveys, it has evolved into a complex system including large data bases on both quantity and quality of coal. Cooperative agreements with 21 coal-producing States are currently in place. This cooperative basis has allowed the system to continue to grow and to insure that it is being used by an ever increasing user community from government and industry.

In our continuing efforts to produce improved data on coal resources, a pilot study involving the U.S. Geological Survey and the Kentucky Geological Survey was initiated one year ago. The purpose of the study is to define the available coal resources in the Matewan Quadrangle, Pike County, Kentucky (fig. 1) and to use this pilot study to develop the technology by which other such coal resource determinations could be made.

Using the powerful data-handling capabilities of geographic information

systems technology, the USGS has integrated the data bases of National Coal Resources Data System (NCRDS) with the factors that would limit the availability of coal for surface and underground mining. Surface mining is restricted by environment-related factors such as surface features which cannot be moved and generally require that barriers be left beneath or around them. Surface mining is also restricted by economic factors such as the limiting strip ratio (amount of overburden relative to amount of coal) which can be achieved and still allow for a profitable enterprise. While there are environmental constraints to underground mining, the restrictions are primarily economic and technologic, related to coal depth and thickness. Also, coal quality may restrict coal availability if the coal does not meet compliance standards for sulfur or if it does not meet user specifications. Quality variations in coals, such as sulfur and ash content, are not randomly distributed geographically or from coal bed to coal bed. Once sufficient geologic data are gathered, the GIS, as a data-handling tool, allows us to map, subdivide, and classify available resources by coal quality parameters.

The pilot study in eastern Kentucky is still in progress. Valid methodologies have been developed, and the available resources are being calculated on each of the 20 mineable coal beds in the area. For the Upper Elkhorn No. 2 coal bed, our analyses indicate that of the 92 million short tons of total coal resources remaining, only 28 million short tons or 30 percent are actually available for future mining (fig. 2). When recovery

factors, that is allowing for the amount of coal that will be left during mining, and the local mining economies are also considered, the currently available resource will be reduced further.

It is not feasible to do similar analyses for all the coal producing areas of central Appalachia, nor is it necessary. The data from the Pike County pilot studies may be extrapolated for some distance, as long as the geologic conditions, the topography, the culture, and the general coal economy are relatively consistent. In the next few years, we plan to test other areas in eastern Kentucky, West Virginia, and Virginia in order to determine how far the data can be extrapolated and the number of quadrangles that would be necessary to adequately characterize the central Appalachians. In areas outside the "central" Appalachians we will be able to use the methodologies developed in the Pike County study to work cooperatively with the appropriate State geological agencies to provide similar resource characterizations.

Preliminary results of the pilot study in the low sulfur coals of eastern Kentucky suggest that previous methodologies for estimating coal resources have overstated the quantity of available coal. Coal resource forecasts that are expressed in billions and trillions of tons may engender great optimism, but may not be necessarily realistic.

This concludes my formal statement. With your permission, Dr. Gluskoter will now show a series of exhibits which demonstrate the methodology I have discussed.

CENTRAL APPALACHIAN REGION

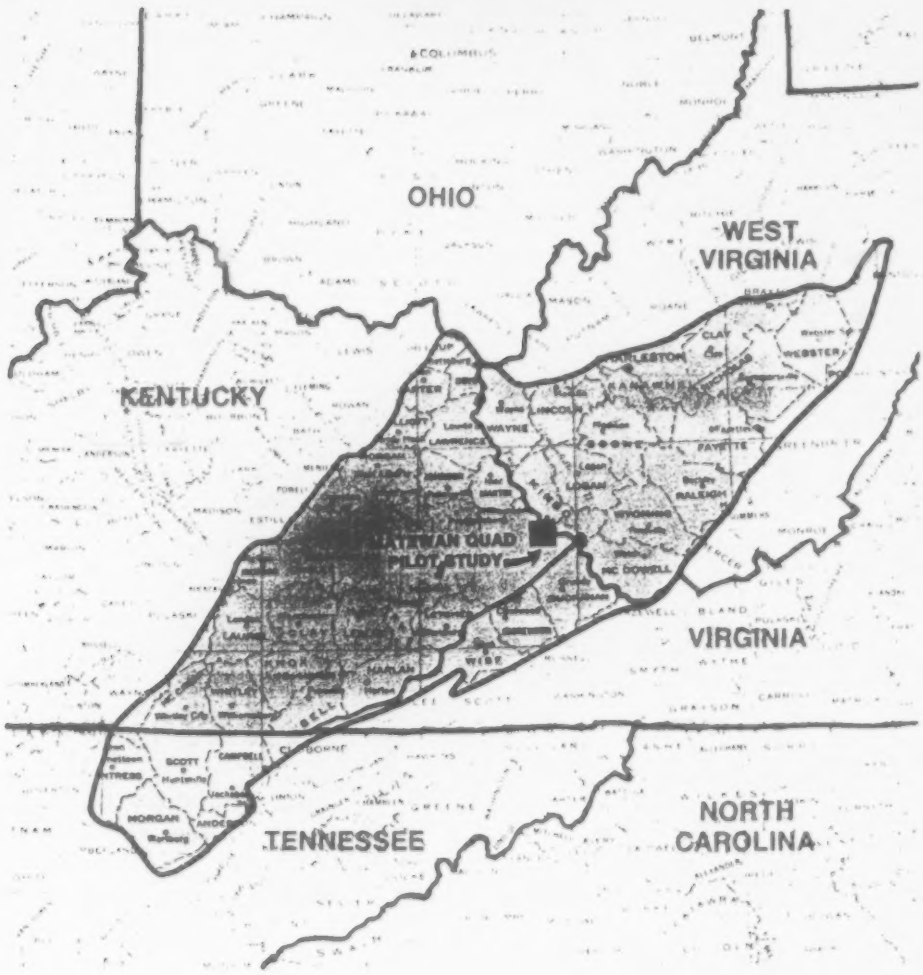
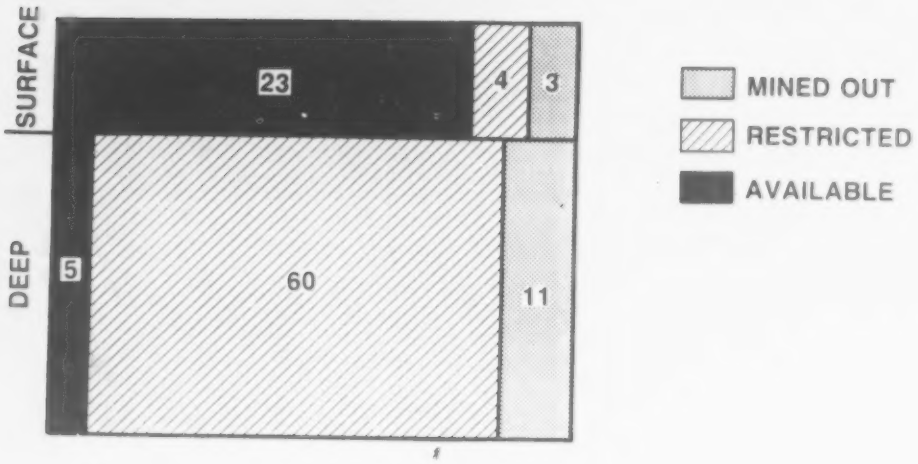


FIGURE 1

UPPER ELKHORN NO. 2



	SURFACE	DEEP	TOTAL
	(IN MILLIONS OF SHORT TONS)		
ORIGINAL RESOURCES	30	76	106
REMAINING RESOURCES	27	65	92
AVAILABLE RESOURCES	23	5	28

FIGURE 2

COAL AVAILABILITY PILOT STUDY

COAL FIELDS OF THE CONTERMINOUS UNITED STATES

CENTRAL APPALACHIAN REGION

AVAILABLE COAL

-equals-

ORIGINAL COAL

-minus-

MINED AREAS

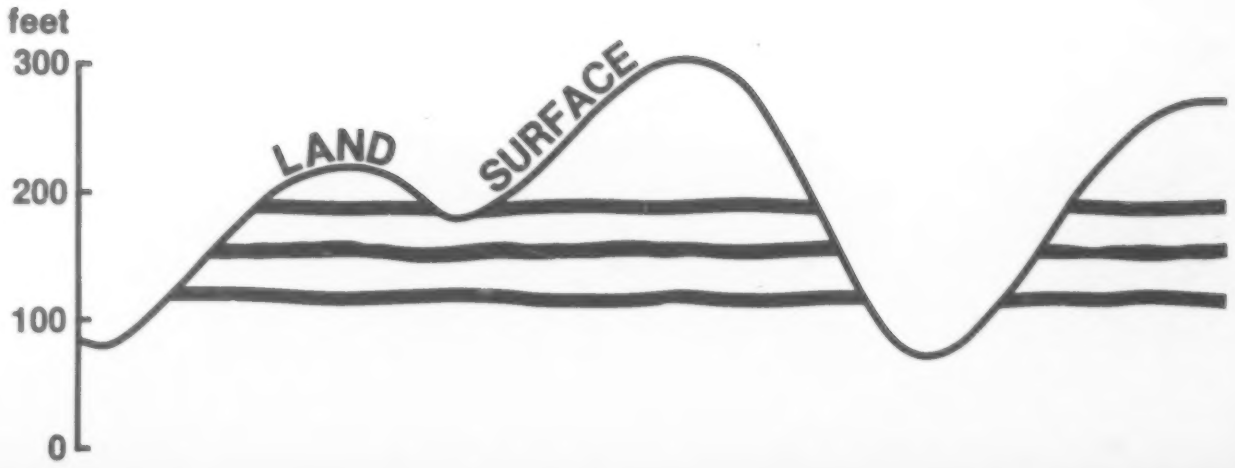
-minus-

ENVIRONMENT-RELATED RESTRICTIONS

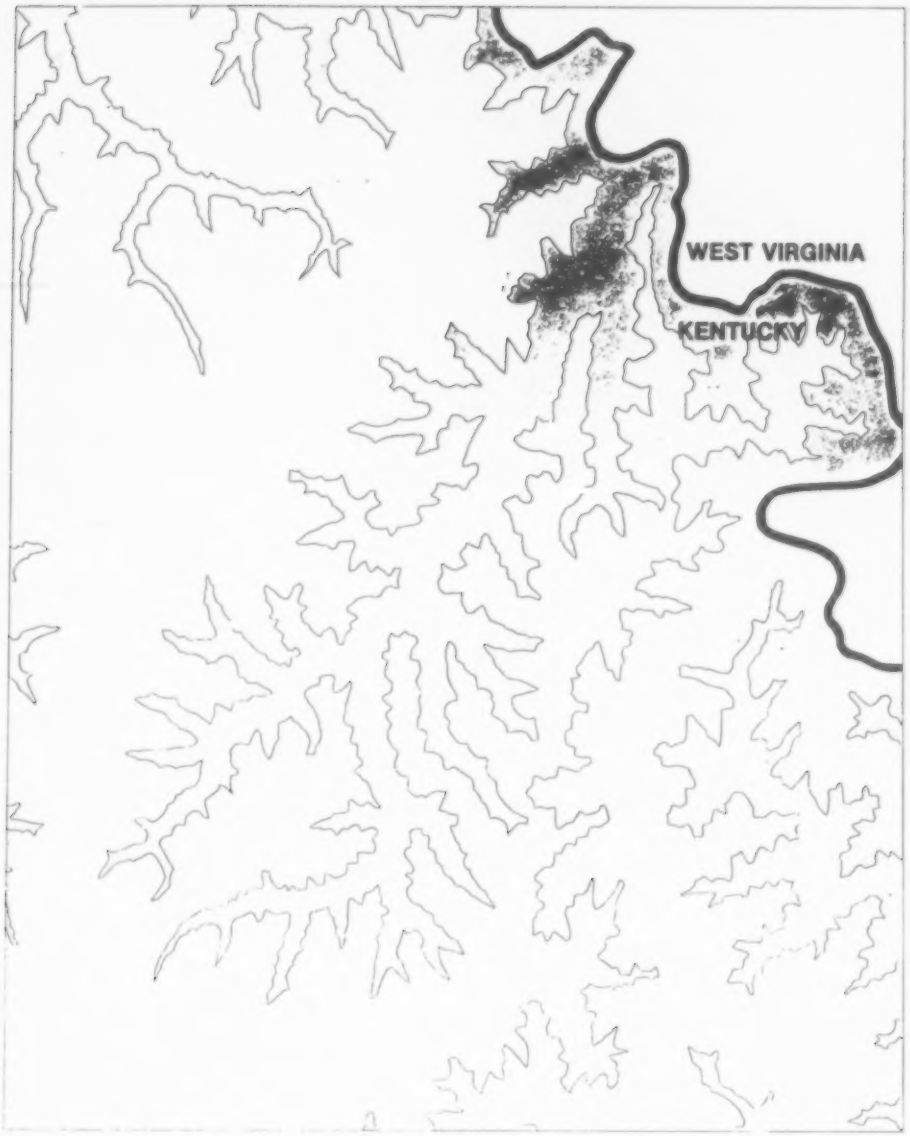
-minus-

TECHNOLOGICAL RESTRICTIONS

SCHEMATIC VERTICAL SECTION SHOWING THREE COAL BEDS

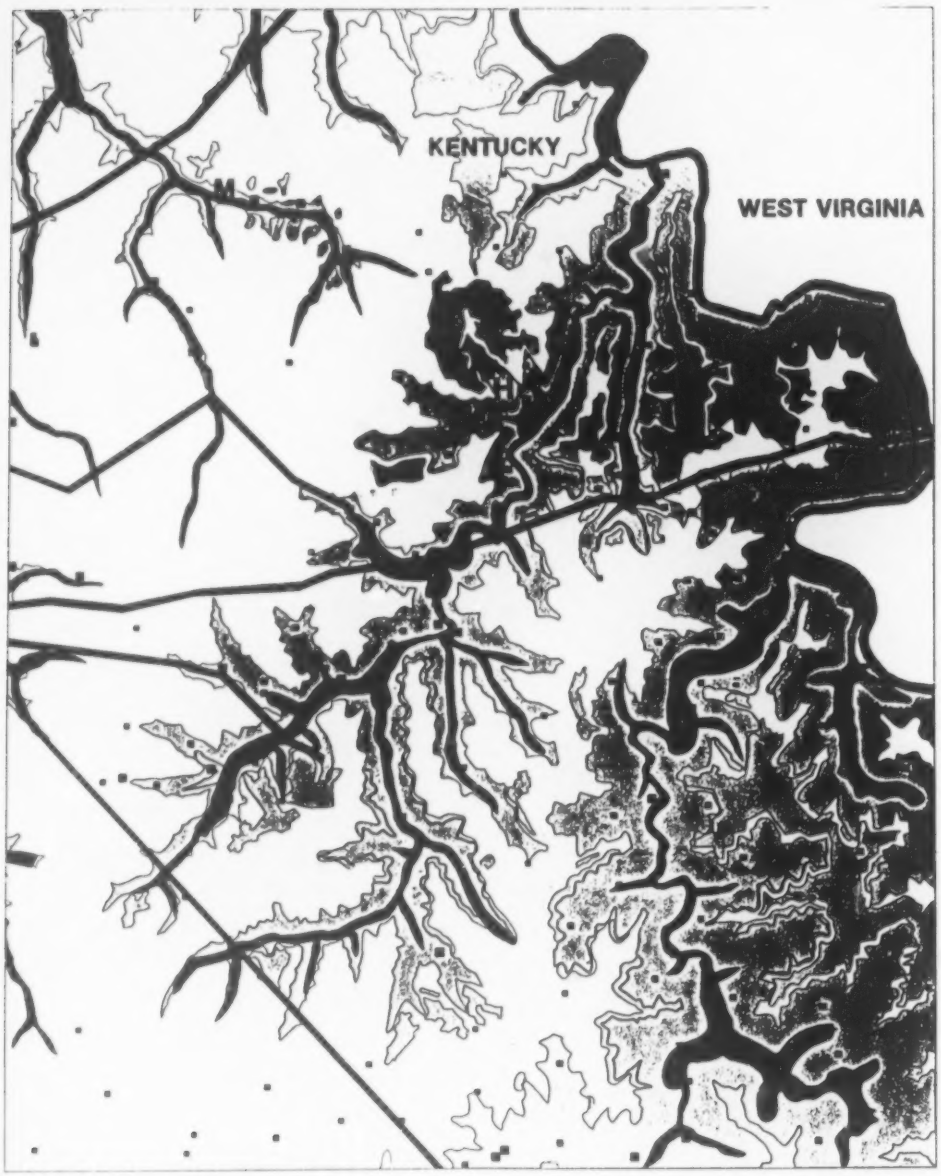


ORIGINAL UPPER ELKHORN NO. 2 COAL SEAM OCCURENCE



ABANDONED AND ACTIVE SURFACE AND UNDERGROUND MINES

ENVIRONMENTAL RESTRICTIONS

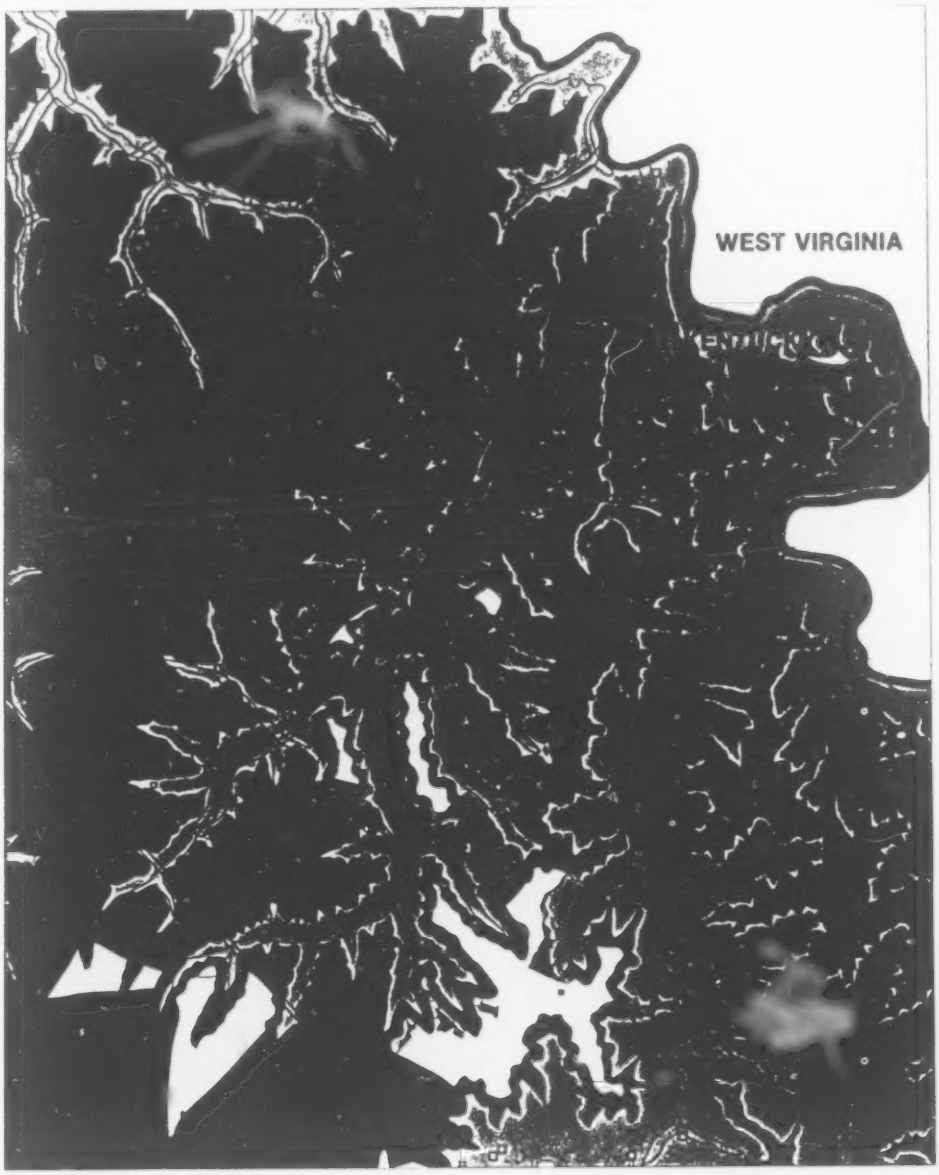


Powerlines, Pipelines, and Gas/Oil Wells with Mining Limits

Cemetaries and Towns with Mining Limits

Streams with Mining Limits

TECHNOLOGICAL RESTRICTIONS



Abandoned Mines Less Than 40 Feet Below the Upper Elkhorn No. 2

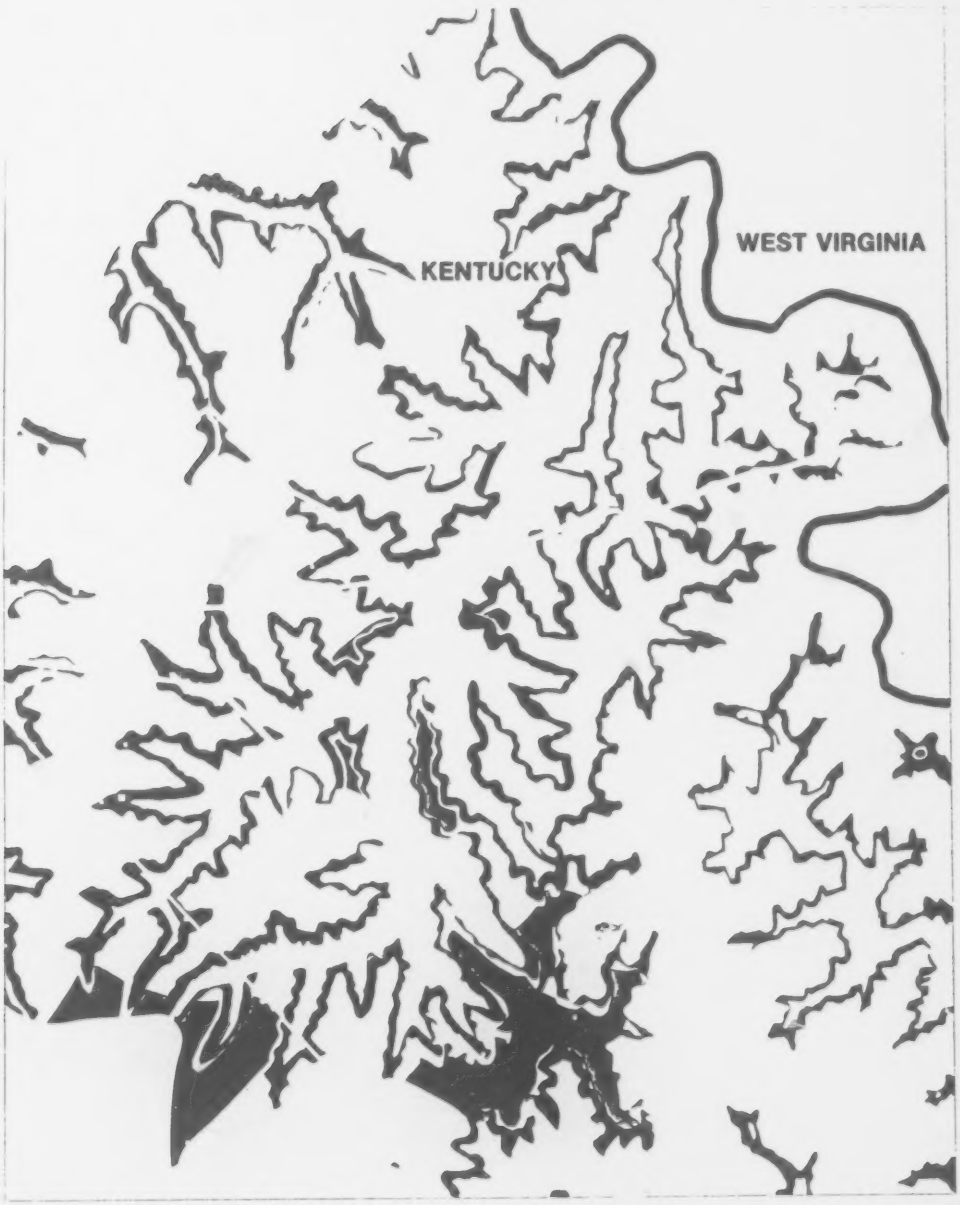
Coal Seam within 40 Feet Above or Below the Upper Elkhorn No. 2

Areas Too Shallow or Too Deep To Be Underground Mined

Too Thin for Mining

NON-COMPLIANCE COAL

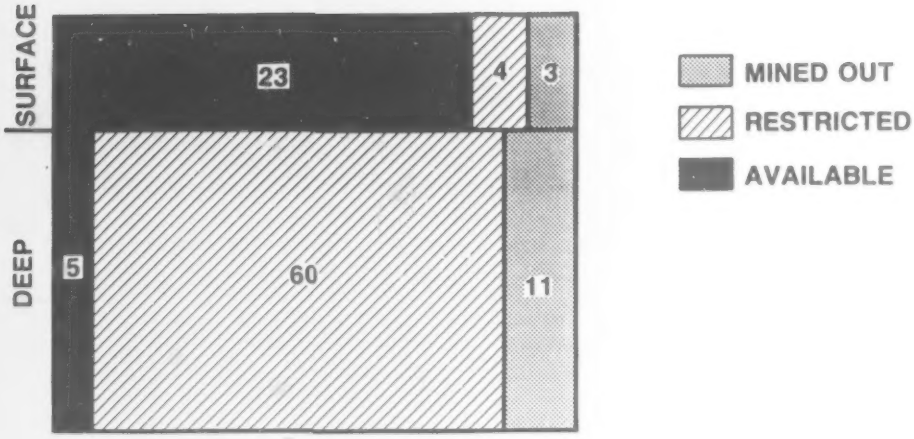
AVAILABLE COAL



Surface Mineable

Underground Mineable

UPPER ELKHORN NO. 2



	SURFACE	DEEP	TOTAL
	(IN MILLIONS OF SHORT TONS)		
ORIGINAL RESOURCES	30	76	106
REMAINING RESOURCES	27	65	92
AVAILABLE RESOURCES	23	5	28

Senator FORD. Why do you not go ahead and get started? You have done an awful lot of work, and I am grateful to you.

STATEMENT OF DR. DONALD C. HANEY, STATE GEOLOGIST AND DIRECTOR, KENTUCKY GEOLOGICAL SURVEY, UNIVERSITY OF KENTUCKY, LEXINGTON, KY, ACCOMPANIED BY DR. JAMES C. COBB, GEOLOGIST AND HEAD, COAL SECTION, KENTUCKY GEOLOGICAL SURVEY, UNIVERSITY OF KENTUCKY

Dr. HANEY. I have asked Jim Cobb to accompany me. Jim is the head of our coal section, and he is the person who is principally responsible for our efforts in the Pike County area.

I have to make a statement here in response to Mr. Doyle's statement concerning the 100-year history of the U.S. Geological Survey.

In 1988 the Kentucky Geological Survey celebrates its 150th anniversary.

Senator FORD. It shows that our leadership is unrecognized.

Dr. HANEY. I am pleased to have the opportunity to speak to this group on a subject which I think seriously affects the attitude of this Nation towards its future energy supplies.

And that is, our imprecise knowledge of the remaining reserves of high quality, reasonable priced coal in the United States.

Many policy makers and planners labor under the misconception that precise coal reserve information can be found in various published coal source estimates, such as the misnamed demonstrated reserve base, the DRB.

Unfortunately, there is a tendency to use the terms, resources and reserves, interchangeably, when in fact, a resource refers to the coal in the ground, and a coal reserve refers to that portion of the coal resource that can be economically extracted.

These terms are generally misunderstood and routinely abused. A case in point is the recent coal resource estimate conducted by the Kentucky Geological Survey for the Commonwealth of Kentucky.

Coal thickness data were compiled, coal resources determined for Kentucky's two major coal fields. This coal resource study estimated the amount of coal in the ground for all coal beds greater than 14 inches in thickness.

Upon completion of this project, and following public disclosure of our estimates, I was dismayed to see these quotes by some policy makers and planners as absolute reserves.

Implicit in their comments was the fact that they considered these resource estimates to be coal reserves, and the State of Kentucky had 96 billion tons of coal available.

This of course is not the case. These estimates represent coal in the ground which we refer to as a resource. Reserves are, by rule of thumb, routinely estimated at one-half the resource estimate; and that, in my opinion, is too high.

I am very concerned that the U.S. Department of Energy's demonstrated reserve base may be based on a similar misinterpretation of data, and estimates contained in the DRB do not reflect the amount of coal available for mining and consumption.

These estimates, therefore, are not a product or a reserve upon which we can base this Nation's energy future.

I would strongly suggest that our coal resource estimates need to be further analyzed and reevaluated. This reevaluation should consider all impediments to resource recovery, and use modern computer technology to assist in determining the Nation's coal reserves.

New estimates must include, as Dr. Gluskoter has just said, the numerous impediments to the removal of coal.

I am convinced that ignoring these impacts on coal development, as has historically been the case, gives this Nation a false sense of energy security.

Oil imports are increasing daily, and domestic production is the lowest since 1977, and not expected to increase significantly.

Therefore, in my opinion, we have to acknowledge coal as our principal energy resource for the present, the near future, and perhaps the distant future.

I commend the National Coal Council for their review of the DRB. In my opinion, their assessment of the extent of the misinformation fostered by the DRB is correct.

I believe the National Coal Council's report on the demonstrated reserve base outlines in detail the weaknesses of current coal estimates, and I concur with the Council's recommendation that these estimates of the National coal reserves must be improved.

I also want to commend the U.S. Geological Survey for their efforts in this area. While I will not go into details concerning the USGS, KGS Matewan Project, I do wish to state that a comprehensive bed-by-bed evaluation, as is being used in this project, would achieve for the Nation the definitive coal reserve estimates as recommended in the National Coal Council's report.

We feel that Kentucky, in cooperation with the U.S. Geological Survey, has systematically employed four of the recommendations suggested by the National Coal Council.

This project has, one, delineated quantitative standards to categorize coal reserves.

Two, it has established project coordination through the national coal resources data system.

Three, it has identified significant impediments, coal quality being one, which impact recoverability of coal resources.

Four, it has clearly established the difference between coal in the ground resources, and that which can be recovered through current mining practices.

Furthermore, I do not think it is necessary to apply these new methodology to entire coal fields to obtain the level of detail needed to determine mineable reserves.

Therefore, I think the national reserve estimates can be completed in a reasonable time and at a moderate cost.

Kentucky is the leading coal producer in the United States. Therefore, I do not have to tell you the importance of coal to Kentucky's current and future economy.

Kentucky Geological Survey routinely supplies information pertaining to coal resources to State and Federal agencies involved in public policy decisions including land use assessments, estimates

for future tax revenues, decisions on environmental issues, and other issues.

So I am quite concerned when numerous policy makers publicly suggest that we have 300 years or more remaining coal at current production levels.

This is completely unrealistic and dangerously misleading.

This misunderstanding of existing coal resource information is not just a Kentucky problem, nor an Appalachian coal field problem. It is a national problem, and requires a national effort.

In my opinion, publications like the DRB, which are based on resource data rather than reserve data, perpetuate misleading and grossly inflated coal estimates.

The report of the National Coal Council succinctly outlines inadequacies of current coal reserve estimates, and the methodologies used to determine them.

Ambiguities inherent in these reserve estimates and in misconceptions they foster relating to the Nation's mineable coal reserves must be eliminated.

In this regard, it is absolutely essential that the Nation have a comprehensive estimate of its coal reserves, with particular emphasis on coal quality relative to clean air standards.

Basic data gathering for these estimates should be done by the coal-producing States. Data compilation and project coordination should be done at the Federal level of the U.S. Geological Survey, through their well established national coal resources data system.

The concept of Federal oversight is strongly recommended in the National Coal Council's report, and in my opinion, is the only way to assure standardization.

As was demonstrated earlier by Dr. Gluskoter, the U.S. Geological Survey, through their NCRDS State cooperative program, has already developed state of the art methodologies to compile, evaluate and estimate reliable coal reserve figures.

The States have access to much data, and are in a position to collect additional data. We must know the distribution of our coal beds.

We must know, or be able to define, differences in coal quality. And we must know the amount of mineable coal we have in this country.

In summary, the time is clearly at hand to eliminate the unrealistic coal reserve estimates currently being used. We have developed a system and procedures to calculate reliable coal reserve estimates.

Coal producing States have the will to become involved in this effort, providing adequate funding is made available. And in my opinion national funding is absolutely essential for this endeavor.

So I hope this subcommittee will seriously consider the subject we are discussing here today and help us move toward a realistic and reliable estimate of our Nation's available coal resources.

Thank you.

[The prepared statement of Dr. Haney follows:]

STATEMENT OF DR. DONALD C. HAMEY,
STATE GEOLOGIST AND DIRECTOR, KENTUCKY GEOLOGICAL SURVEY,
UNIVERSITY OF KENTUCKY
before the
SUBCOMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
September 18, 1987

I am pleased to be here today to discuss the National Coal Council's report on the Demonstrated Reserve Base (DRB) and other issues relating to the quality and recoverability of U.S. coal reserves. I want to thank Senator Melcher for this opportunity.

Gerald Blackmore, Chairman of the Coal Policy Committee for the National Coal Council, and Stuart Ehrenreich, Leader of the Reserve Data Base Work Group for the National Coal Council, are to be highly commended for their thorough and accurate assessment of the extent of misinformation fostered by the DRB about our Nation's coal reserves. I believe the National Coal Council's report on the Demonstrated Reserve Base outlines in detail the weaknesses of current coal estimates, and I agree with the Council's recommendations for improving coal-resource/reserve estimates for the United States.

I also want to commend Doyle Frederick and Hal Gluskoter for their fine presentation. While I will not go into detail concerning the U.S. Geological Survey-Kentucky Geological Survey Matewan Project, I would like to suggest that a comprehensive bed-by-bed evaluation as is being used in this project would achieve for the Nation the definitive coal-resource/remaining-reserve estimate recommended in the National Coal Council's report. Furthermore, by applying this new methodology to selected strategic areas rather than entire coal fields, the level of detail needed to determine mineable reserves can be achieved in a reasonable period of time and at a moderate cost.

Kentucky is the leading producer of coal in the U.S., contributing nearly one-fifth of the Nation's total annual production. Kentucky is also one of the few states in the Nation where income from mineral production exceeds income from agriculture. The total value of mineral production for Kentucky is nearly twice that of all farm products combined. Therefore, issues relating to coal resources and coal resource estimates are of vital interest to the economic well-being of Kentucky and the Nation.

The Kentucky Geological Survey and geologic surveys of other coal-producing states are charged by state government to identify, characterize, map, and estimate coal resources in their respective states. These resource estimates are used by the general public and the coal industry for coal exploration and development. Additionally, resource estimates are essential to state and Federal agencies in making public policy decisions, regional and local land-use assessments, estimates of future tax revenues, evaluations of labor and employment trends, regulations for public utilities, and decisions on numerous environmental issues.

The Kentucky Geological Survey is routinely contacted for information pertaining to coal resources by individuals as well as many groups and agencies. These include the Office of Surface Mining, U.S. Bureau of Mines, the Mine Safety and Health Administration, U.S. Geological Survey, Bureau of Land Management, Minerals Management Service, Office of Technology Assessment, U.S. Department of Energy, U.S. Army Corps of Engineers, Environmental Protection Agency, Internal Revenue Service, private companies and corporations, public utilities, financial institutions, and other academic, research, and planning institutions. With the high level of interest in coal resource information, it is in the Nation's best interest that a Federal program to determine recoverable coal reserves of the U.S. be implemented as recommended in the National Coal Council's Report.

Kentucky's experience in resource estimation serves as an example of the problems encountered with the current Demonstrated Reserve Base. In 1983, the Kentucky Geological Survey completed an estimate of the coal resources in Kentucky. These resources were defined simply as all coal in the ground greater than 14 inches in thickness, and within 3 miles of a known coal thickness measurement. The coal-resource figures resulting from this project were a gross estimate of all coal in the ground in Kentucky based on widely scattered coal thickness data for more than 100 mineable coal beds. As soon as the figures for total coal in the ground were made public, the distinction between resources and mineable reserves was lost. As a result, gross-tonnage figures, intended as an estimate with many qualifiers and inherent omissions, became recoverable reserves in the minds of the public and many public officials. The totally unrealistic conclusion that remaining reserves were adequate for centuries of coal production was reached by dividing these gross-resource estimates (assuming them to be in one super-efficient room and pillar mine with 50 percent recoverability) by the average annual production. For Kentucky, this erroneous calculation results in nearly 300 years of remaining production, which we know is grossly exaggerated and completely misleading. These estimates did <u>not</u> account for coal quality, mineability, recoverability, geologic obstacles, legal constraints, economic factors, environmental factors, and unrecoverable coal. In this regard the National Coal Council's report emphasizes the need to estimate resources in various coal quality categories (ie. sulfur content, heating value, ash content, grindability, and others) not addressed in the DRB. It is not sufficient to simply know how much coal is present, but it is also essential to be aware of its possible uses. For example, many boilers in coal-fired power plants are designed to burn only coal with less than 2 percent sulfur; therefore, it is important that sufficient reserves of low-sulfur coal be identified. Lack of sufficient information concerning coal quality

can adversely affect the ability of governmental agencies to formulate adequate energy, research, and environmental policies.

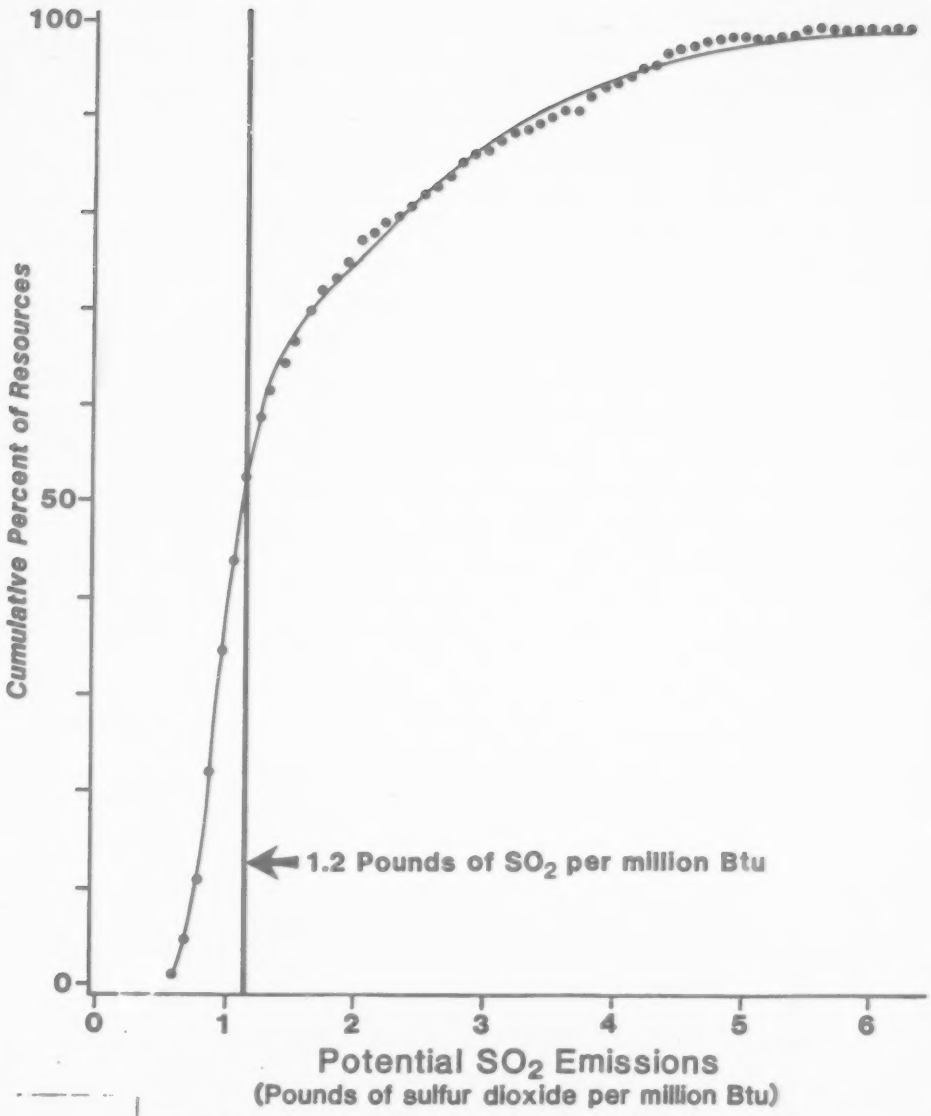
A recently completed study by the Kentucky Geological Survey suggests considerably less low sulfur coal remaining in the central Appalachian Basin than was previously thought (accompanying figure and table). This statistical analysis of pounds of sulfur per million Btu's for eastern Kentucky coal beds indicates that 51 per cent of the coal in the ground (resources) would comply with the current Clean Air Act standard of 1.2 pounds of sulfur per million Btu's. If, however, the movement toward more stringent regulations raised the standard to 0.6 pound of sulfur per million Btu's, only 1 per cent of the coal in the ground would comply. This would have a devastating effect on Kentucky's mining industry and the State's economy. Therefore, it is prudent for policymakers to be aware of the implications of coal quality on the Nation's coal reserves.

The report of the National Coal Council succinctly outlines the inadequacies of current coal-reserve estimates and the methodologies used to determine them. Ambiguities inherent in these reserve estimates and the misconceptions they foster relating to the Nation's mineable coal reserves must be eliminated. In this regard, it is absolutely essential that comprehensive estimates of U.S. coal reserves (with particular emphasis on so-called compliance coal) be undertaken. Basic data gathering for these estimates should be accomplished by the coal-producing states while data compilation and project coordination should be done at the Federal level by the U.S. Geological Survey through their National Coal Resources Data System. The concept of Federal oversight is strongly recommended in the National Coal Council report and is the only way to assure standardization in coal-reserve calculations from state to state. As was demonstrated earlier by Dr. Gluskoter, the USGS, through their well-established NCRDS state cooperative program, has already developed state-of-the-art methodologies to expeditiously compile, evaluate, and estimate reliable coal-reserve figures.

We feel that the Matewan Pilot Project, currently underway as a cooperative effort between the U.S. Geological Survey and the Kentucky Geological Survey, has systematically employed all four of the recommendations presented by the National Coal Council. This program has: (1) delineated quantitative standards to categorize coal reserves; (2) established project coordination through NCRDS; (3) sought to identify all factors that could impact mining; and (4) clearly established the difference between total coal in the ground (resources) and that which can be economically mined (reserves).

In summary, the time is clearly at hand to eliminate the unrealistic coal-reserve estimates presently being used in this country. The U.S. Geological Survey currently has a system and procedures in place to calculate reliable reserve estimates. Coal-producing states are anxious to increase their cooperation in this effort if funding is made available. National funding is essential for new reserve estimates, especially in light of the high-tech, computer-assisted methodologies already in use by NCRDS.

Thank you.



Theoretical cumulative distribution function of potential sulfur dioxide emissions for eastern Kentucky coal resources. Circles show actual values.

—Estimated Percentages of Eastern Kentucky Coal Resources That Would Be in Compliance at Various Emission Standards. Percentages Are Derived from the Theoretical Distribution Function.

Emission Standard (x) (In lbs. of SO_2 per million Btu)	Percent of Resources (F(x)) in Compliance
1.2	51
1.1	43
1.0	32
0.9	22
0.8	12
0.7	5
0.6	1

Senator FORD. Thank you very much, Don. I have two or three questions here that I would like to ask you.

From your experience with the distortion of Kentucky's gross tonnage figures as related in your statement concerns me. Were these figures included in the DRB as minable reserves?

Dr. HANEY. I cannot answer that. I do not know how they determined that.

Senator FORD. Would the Geological Survey people know?

Dr. GLUSKOTER. The DRB only is limited by depth and thickness, so these other parameters would not have been proved from the reserve figures.

Senator FORD. Well, then, in your statement on page 4, you say that 51 percent of the coal resources would comply with the current Clean Coal Act standard, for Eastern Kentucky.

Do you have figures on how many reserves comply?

Dr. HANEY. No, we do not have those kinds of coal quality data.

Dr. COBB. Not until more studies like Matewan are done will we actually be able to look at a bed-by-bed. And that is the way—I think we can cut through a lot of this by just saying that the States turn over to EIA bed-by-bed resource evaluation.

They take and recombine those. What we give them are resource numbers, and they take what is done on a bed-by-bed basis and put it all back together again and call it a reserve.

They are not intended at that point to be a reserve. And until we do more of the Matewan type studies, we will not be able to go from the resource to a recoverable reserve.

Senator FORD. In the EIA testimony, Don, they state that EIA does maintain information on sulfur and Btu content. To your knowledge, does this information exist in Kentucky?

Dr. HANEY. Yes, sir, some of it exists because we have collected it. And they routinely come to our organization to obtain those kinds of data.

I am not saying that there is sufficient data by any means, because there is not.

Senator FORD. If so, what is your estimate of the quality of the data?

Dr. HANEY. Of our data?

Senator FORD. It is minimal, then, is it not?

Dr. HANEY. I think the quality of the data that they have gotten from Kentucky and through the USGS on the NCRDS program is excellent.

Senator FORD. Mr. Frederick, to your knowledge, does this information exist across the board as it relates to sulfur content and Btu?

Mr. FREDERICK. I think it exists in the context that you just discussed with Dr. Haney. And that is, that we have limited amounts of quality information.

That limited amount is good in and of itself, but it surely is not enough to statistically, accurately predict .9 coal available for the entire country.

And I think that was the point that Kentucky Geological Survey folks were making, in terms of paying attention to that, and collecting more so that a statistically valid estimate could be made.

Dr. HANEY. We initiated this coal sampling effort seven or eight years ago, and that, in my opinion, was the first time that reliable, standardized coal quality data started becoming available for Kentucky.

And I am not convinced that many States have collected standardized data that are very valid.

Senator FORD. Let me back up just a moment on the question I asked you on the 51 percent, I guess that was at 1.2, was it not, on compliance?

Dr. HANEY. Right.

Senator FORD. What if that is dropped to .9 or what if it is dropped to .6, how much coal do we have left?

Dr. COBB. Well .6, even Kentucky, which is one of the principal producers of compliance coal, at .6, our estimates are that we drop down to one percent.

Senator FORD. One percent of the resources or reserves?

Dr. COBB. Thank you, Senator. Of the resources. We cannot yet tell how that translates into reserves.

Senator FORD. So even if you go to .6, one percent of the coal resources in Kentucky would be all that could be called compliance coal?

Dr. COBB. I hate to go to compliance coal terminology when you go from a resource.

Senator FORD. Well, I know, but your resources is one, and your reserves another; I understand that.

So you only have resources that you can refer to as the one percent.

Dr. COBB. At the general picture.

Senator FORD. Yes, I understand that. I am with you on the resources and reserves. But what you are looking at is 100 billion tons or whatever it is that is way out there, and we want to reduce that down to 51 percent of the reserves, and then we get into one percent of the resources, and yet that one percent will be reduced.

So we are going to wind up with very little energy available if we go to .6.

Dr. COBB. That is correct.

Senator FORD. What would it be, then, Jim, if we get to .9?

Dr. COBB. We projected statistically that about 22 percent of the resources of eastern Kentucky would comply at .9.

For western Kentucky, which is a very significant coal resource, none.

Senator FORD. None? And probably none at .9?

Dr. COBB. Almost none at .9.

Senator FORD. Don, you state that basic data gathering for comprehensive coal reserve estimates should be done at the State level.

Do the States have the resources to accomplish this?

Dr. HANEY. No, sir, we do not have the resources. I think Kentucky has invested very significantly in this area over the past 10 years, because we did, with very little Federal assistance, fund that resource study that we started back in the early 1970s.

So I think we have made a tremendous effort.

Senator FORD. In your estimate, then, Don, how long, if they had the proper funding, not humongous amounts but some that could

keep them going, how long do you estimate that it would take to gather the data on a state-by-state basis.

Dr. HANEY. I believe I would have to yield to Jim and Hal on that.

Senator FORD. Do you think the State should be able to gather this data and should do it?

Dr. GLUSKOTER. Yes, I think the proper function is for the States to do it.

Senator FORD. Now, it is obvious under the fiscal problems of the country today and States in particular, they probably will not have the wherewithall to get it done.

But say we were able to supplement that at the Federal level by a reasonable amount. How long do you believe it would take to gather this data, then?

Dr. GLUSKOTER. Data for the purpose of coming up with a better available resource number, on a nationwide basis, I think it could be done in 10 to 15 years.

Senator FORD. Well, with almost 50 percent of the consumption of oil in this country now being imported, and we had about 30 percent in 1973 when we had the embargo, with SPRO not being funded by this Administration for reserve, that is about like a bridge that has a 15 year life left in it, and you have not started building the ones to replace it.

Can either one of you tell me what the, not resource now, but reserves, how much the reserves might be increased with clean coal technologies?

You can go to west Kentucky, and they have no compliance coal, you could use those reserves down there with clean coal technologies, for example the fluidized bed combustion operation down at Shawnee, and other things.

Now, that is going to use 600,000 roughly tons per year of west Kentucky basically high sulfur coal for that demonstration purpose down there.

So under those circumstances, we might be able to increase our energy reserve. Am I correct in that?

Dr. HANEY. Yes.

Mr. FREDERICK. Absolutely.

Senator FORD. What you are telling us that with your experience, your background, your professionalism, that we ought to get on with it?

Dr. HANEY. Yes, sir.

Senator FORD. Don, how representative is the experience of the Upper Elkhorn No. 2 coal bed to the rest of Kentucky?

Dr. HANEY. Well, we selected that because we felt it was very representative of east Kentucky. It certainly is not representative of west Kentucky.

We would, I think, on down the road, have to do a similar pilot study in that west Kentucky-Illinois basin area, to use as a standard there.

Senator FORD. Would it be harder to do west Kentucky or easier?

Dr. HANEY. I do not think our data points, et cetera, would be as dense in west Kentucky, because the relief there is much less, so the coal beds are below, most of them, below drainage.

So instead of being able to collect outcrop data to supplement drill hole data, we would have to go more towards drill hole data over there, and of course, that is more expensive.

Senator FORD. So it would be more expensive in west Kentucky?

Dr. HANEY. It certainly may be, yes.

Senator FORD. Now, where Elkhorn No. 2 comes out, you showed the terrain. Is that susceptible to core drilling?

Dr. HANEY. Yes, sir.

Senator FORD. Are we developing any new extraction practices that might increase the productivity?

Dr. HANEY. I am certainly not an expert in that area, but I do not think we are making a great deal of progress in that area.

Thin seam mining is a technique that is being proposed now.

Senator FORD. It is just amazing when they start talking about out West with a 10-, 20-foot seam, and we are talking about a 14 to 20 inch seam in Kentucky. And we have the overburden. They, in the West just go out and dig a hole, almost, because it is way out in nowhere, and they have a lot less environmental problems than we do.

Do you want to follow up on that question?

Dr. GLUSKOTER. The increase in long wall mining underground in this country, in areas that have been long walled in the past I think is increasing productivity, one factor.

But it is not a major new technology.

Senator FORD. The reason I asked that is, we find some additional coal mined in 1986 over 1987—I mean, over 1985, in Kentucky, with fewer employees.

So you either have new techniques, one, or better productivity by the individual.

Dr. HANEY. Or perhaps the ratio between surface production and underground production might shift.

Senator FORD. Yes, that could be it. Well, underground increased more—did it not increase more percentagewise in 1986 than it did in 1985?

Dr. COBB. Yes.

Senator FORD. I think you all have challenged us a little bit here this morning, and it is a point I have been wanting to make for some time.

And I think I have the technical expertise here this morning to back up those concerns that I have.

And this country always reacts. We are sitting here with nearly 50 percent of the oil consumption of this country imported. And we know at some point it will not continue on that basis.

And as we find it easier to secure from overseas, we are reluctant to search for new sources here, and the price—of course we are a profit conscious group of folks; we do not want to start anything to lose money on.

The only fellow I ever heard do that, he lost money on every deal and depended on volume to get by.

There may be some additional questions that I will have of you four gentlemen. And I will send those to you in writing, and ask for you to respond in a timely fashion.

As the acting chairman of the subcommittee here this morning, and so I will advise that we will keep the record open for two more

weeks, and answers to the written questions we hope will be back by that time so we can begin to compile the significant information that you all have given us this morning.

Now, are there any closing remarks any of you would like to make before we adjourn?

I have enjoyed it this morning. I appreciate it. We are going to be in touch. And we are going to be working very close with you, because you are the individuals who have had the practical experience, the technology and the practical experience.

You have brought it together, and you begin to bring practical answers to the problems that we are facing.

Thank you all very, very much.

[Whereupon, at 12:10 p.m., the hearing was adjourned.]

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